

Insects

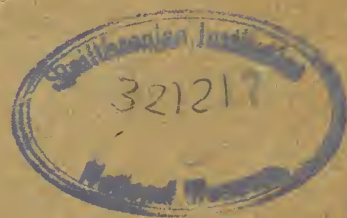
MEMOIRS
OF THE
American Museum of Natural
History.

VOLUME I, PART VI.

Monograph of the Sesiidæ of America, North
of Mexico.

By WILLIAM BEUTENMÜLLER.

March, 1901.



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VI.—MONOGRAPH OF THE SESIIDÆ OF AMERICA,
NORTH OF MEXICO.

BY WILLIAM BEUTENMÜLLER.

PLATES XXIX-XXXVI.

INTRODUCTION.

The Clear-winged Moths, or Sesiidæ, may be superficially recognized by their narrow and more or less transparent wings, by the clavate or filiform antennæ, which are either ciliate, pectinate, or simple; also by the tuft at the end of the body, which they can spread like a fan, especially in the male. At first sight, a box of these insects would appear to be a number of individuals differing only in size, with here and there a slight change in the coloration. On the whole, the specific and generic differences are very slight, though constant in most cases, but it requires close observation and careful comparison of specimens to distinguish one from another. In some species, especially of the genus *Sanninoidea* and group *Pyr-rhotania*, the males differ from the females, and in a number of instances the males have been described under one name and the females of the same species under another, or individuals more or less worn through age and flight have been described and named as different species, thus creating considerable confusion in the study of this family of moths. Another difficulty surrounding this family is that the larvæ feed within the stems of plants, in roots, or under the bark of trees, and thus are not easy of access, while the work of raising them through their various stages becomes a task of no inconsiderable difficulty; moreover,

the perfect insects are rarely found, and several years must elapse before the species of his own district comes into the hands of a collector. They also soon lose their scales through flight, and when pinned become covered with grease, and important characters are often lost; consequently considerable attention must be given to the condition of the specimens before describing or naming them. My studies of this difficult group of moths have been mainly based upon the extensive material contained in the well-known Hy. Edwards collection, which is now the property of the American Museum of Natural History. The Museum collection contains, with the exception of eight, all the known species of Sesiidæ found in America, north of Mexico. With the aid of the types and material which have been submitted to me for examination, I have been enabled to recognize all the known species occurring in this country, except the following, the types of which, as far as I can ascertain, have been destroyed, and the descriptions of them are too vague for their determination: *Sesia nomadæpennis*, *S. bibionipennis*, *S. anthraciformis*, and *S. chrysidipennis*. The last is probably the same as *S. mellinipennis*.

The descriptions of the species in the following pages have in nearly all instances been taken from fresh material, and the main object of the present monograph is to place on record, in a permanent form, with colored figures, all the species of Sesiidæ of our fauna. It has also been my aim to make the paper as complete as possible by adding the descriptions of the larvæ and the food-habits. It has not been possible to carry out this ideal to any extent, as the information in this respect is still very fragmentary and many years must elapse before we shall be enlightened on this subject. It, therefore, has been deemed best not to wait, but to bring forth the information we now possess in as condensed and at the same time luminous a form as possible.

In advance of the present monograph I have published from time to time a series of papers containing the results of my studies of this family of moths, and I believe that the species and genera found in this country are now fairly well known. Nothing, however, has hitherto been published on the literature of the family, except a few references given by me in the papers alluded to above, and a few given by other writers. In view of this fact, I began, some time since, a systematic investigation of the literature of the subject, and to my surprise found before me a task of no small magnitude. Little did I suspect when I began that the work was almost endless, especially as regards the species considered of economic importance, and the two European species (*Ægeria apiformis* and *Sesia tipuliformis*) found also in this country. The literature of these species is very extensive and the deficiencies of the present work relate mainly to these, but I believe that the titles here presented cover nearly every point of technical importance. All the titles were taken by me, except when marked "not seen." These were obtained either from Dr. M. V. Slingerland or have been quoted from the 'Bibliography of the more Important Contributions

to American Economic Entomology,' published by the United States Department of Agriculture, by Messrs. Henshaw and Banks ; a number of titles have also been taken from other sources.

The titles have been arranged chronologically, and an attempt has been made to bring the subject down to the end of the year 1899, and it is as complete as I can make it at present. I am fully aware that many titles are yet to be added, and I would be glad to have my attention called to any errors or omissions.

Finally, it becomes my great pleasure to express my obligations to many friends and correspondents for the generous aid they have given in the preparation of this memoir. To Prof. J. H. Comstock, of Cornell University, I am indebted for the notes on the venation, and to Dr. H. G. Dyar, of the United States National Museum, for the specific characters and descriptions of the larvæ. To Prof. W. B. Barrows for the loan of the types in the Tepper collection in the Agricultural College of Michigan, and to Dr. L. O. Howard and Dr. H. G. Dyar for the loan of the types and material in the collection of the United States National Museum. To Mr. S. Henshaw for the loan of Harris's types in the Boston Society of Natural History and for material from the Museum of Comparative Zoölogy. Mr. Jacob Doll has kindly placed at my disposal the types in the Neumoegen collection. For notes and loan of specimens I am also under obligation to the following entomologists : Mrs. A. T. Slosson for the presentation of the types of *Sesia seminole* and *S. marica*, and other Florida material ; Prof. Otto Lugger, St. Anthony Park, Minn. ; Prof. D. S. Kellicott, Columbus, Ohio ; Prof. F. H. Hillman, Reno, Nev. ; Dr. H. H. Behr, San Francisco, Cal. ; Messrs. L. H. Joutel, Chas. Palm, and Rev. J. L. Zabriskie, New York ; Prof. F. M. Webster, Wooster, Ohio ; Prof. S. A. Forbes, Champaign, Ill. ; Messrs. R. W. Doane, Pullman, Wash. ; E. E. Bogue, Stillwater, Oklahoma ; James Fletcher, Ottawa, Canada ; M. V. Slingerland, Ithaca, N. Y. ; A. D. Hopkins, Blacksburg, W. Va. ; Prof. J. B. Smith, New Brunswick, N. J. ; Mr. C. W. Johnson and Dr. Henry Skinner, Philadelphia, Pa. ; Prof. C. M. Weed, Durham, N. H. ; Sir George F. Hampson for colored sketches of Walker's types in the British Museum ; Messrs. G. W. Browning, Salt Lake, Utah ; C. P. Gillette, Fort Collins, Col. ; Trevor Kincaid, Seattle, Wash. ; E. P. Felt, Albany, N. Y. ; George H. Hudson, Plattsburg, N. Y. ; and Dr. William Barnes, Decatur, Ill.

The excellent colored drawings for Plates XXIX-XXXII inclusive were made by Mr. L. H. Joutel, and Plate XXXIII by Miss Edna L. Hyatt. Plates XXXIV-XXXVI and the figures in the text were drawn by Miss Marion T. Meagher.

POSITION OF THE FAMILY.

This family of moths was left in peace for over a century at the head of the Heterocera, but has received a varied treatment of late years, having been

shifted from place to place by various authors, and it has not as yet found a definite systematic position.

Linné (1758) placed the species in the Sphingidæ, but they were arranged by subsequent writers between this family and the Zygænidæ, in which position they were left undisturbed for many years. Newman in 1832 called attention to the relationship of the Sesiidæ to the Cossidæ and Hepialidæ, and in 1878 Butler attempted to prove their affinity to the Gelechidæ, in which group they were also placed by Meyrick in 1895. Dr. Dyar, the latest writer on the subject, likewise arranges them in the lower families of the Heterocera, in which position they are more apt to fit than in the higher families of this order, as placed by the earlier writers on the subject.

At any rate, no matter where they may be placed hereafter, the members of this family, in the course of their evolution, have progressed far from the primitive type of the order, as pointed out by Professor Comstock. The species have kept closely together, and there is less variation in the structure of the wings and other organs than one would expect to find in a group so highly specialized.

CHARACTERS OF THE FAMILY.

Head small, eyes naked; ocelli present. Labial palpi moderately long, curved, ascending, rarely porrect, terminal joint short, pointed. Maxillary palpi rudimentary. Proboscis well developed or rudimentary. Antennæ long, gradually dilating from about the middle to near the apex, thence rather pointed, sometimes almost filiform; ciliate or pectinate in the male, simple in the female. Abdomen elongate, slender, narrow, rarely robust, and provided with a fan-like anal tuft or with pencils in male.

Anal tuft of female bunch-like or almost wanting. Legs often with thick tufts of hairs. Mid-tibiæ with one pair of spurs; hind tibiæ with two pairs. Fore wings, elongate, narrow, more or less transparent or opaque, with 11 or 12 veins, R_4 and R_5 usually stalked; vein 2d A present. Hind wings elongate, ovate, with three internal veins. Frenulum consolidated; similar in both sexes.

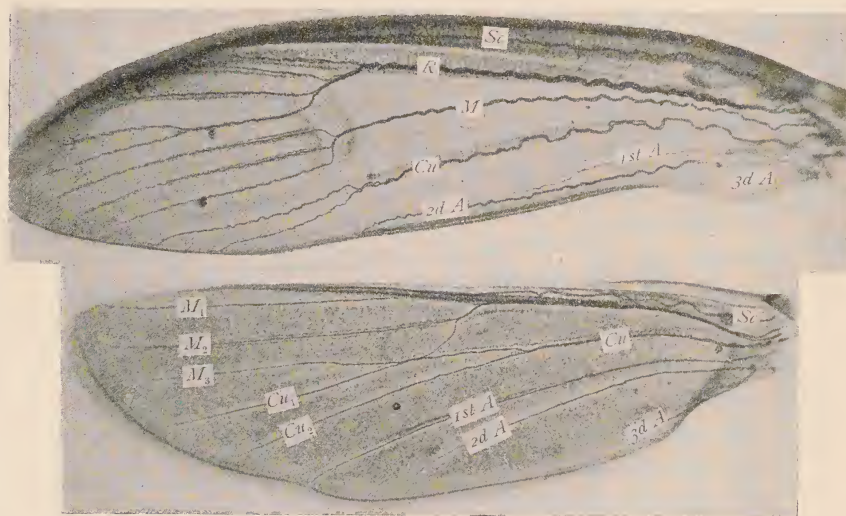


Fig. 1. Wings of a Pupa of *Sanninoidea exitiosa*, showing the Tracheæ of the Wing-veins.

Regarding the wings of the Sesiidæ, Prof. John Henry Comstock writes me as follows:

"The wings present several striking characteristics:—the loss of scales from a greater or less portion of the surface; the narrowness of the fore wings; the great reduction of the anal area of the

fore wings; the lack of reduction of the anal area of the hind wings; and the unusual development of the frenulum and of the frenulum hook in the female as well as in the male.

"Although the members of this family in the course of their evolution have progressed far from the primitive type of the order, they have kept closely together; there is much less variation in the structure of the wings than one would expect to find in a group so highly specialized.

"In the fore wings, veins R_4 and R_5 coalesce to a greater or less extent; in some genera, as *Calasesia* (Fig. 20) and *Zenodoxus* (Fig. 21), the coalescence is complete, and thus the number of veins is one less than usual.

"The anal area of the fore wings is so reduced that in all the forms examined by the writer only a single short vein remains in the adult; this is the second anal vein, a fact determined by a study of the wings of pupæ (Fig. 1).

"A study of the development of the wings shows also that there is a striking difference in the behavior of media in the two pairs of wings. This difference is the most remarkable feature observed in the wings of this family.

"In the fore wings, the stem of media is lost in the adult, as it is in other specialized Lepidoptera. In the pupa, the medial trachea is very distinct; but in the adult there is no trace of the main stem, and the branches are connected with the radial and the cubital tracheæ. From this it follows that the so-called discal cell of the fore wings is cell $R + M$.

"In the hind wings, however, the stem of media persists in the adult; but it has moved towards the costal margin of the wing so that the so-called discal cell is cell M. The moving forward of the main stem of media has been attained in the pupa stage (Fig. 1).

"In the most generalized condition shown by the hind wings, there are three closely parallel veins near the costal margin. As just pointed out, the third of these is the main stem of media and its continuation M_1 . The other two veins are vein $Sc + R_1$ and vein R_s , as in other Frenatæ. This region of the wing is so narrowed that I have been unable to find any indication of the forking of the radius in the adult, but it is clearly indicated in the pupa (Fig. 2).

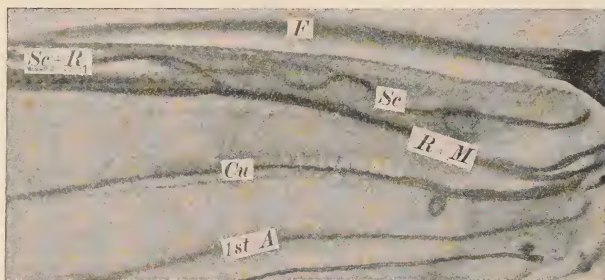


Fig. 2. Part of a Hind Wing of *Sanninoidea exitiosa*, showing the course of Tracheæ R_1 .

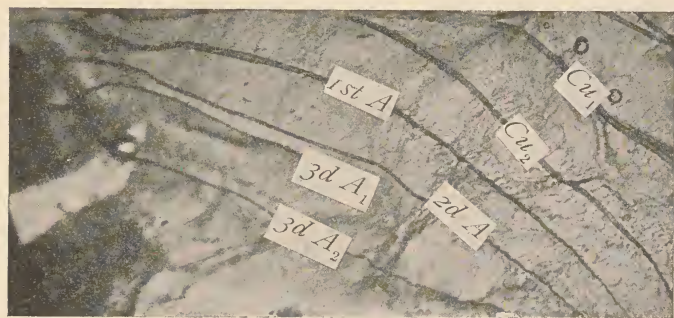


Fig. 3. Part of the Anal Area of the Fore Wing of *Pieris*, showing the forking of the 3d Anal Vein.

"In some forms there are four anal veins in the hind wings. In these cases it is probably the third anal vein that is forked. I have not had material to demonstrate this for the Sesiidæ; but I have done so for other families of the Frenatæ. In *Pieris*, although there is only one anal vein in the fore wing of the adult, in the pupa there are four anal tracheæ, the third being forked (Fig. 3). When, therefore, there are four anal veins, they may be designated as 1st A, 2d A, 3d A₁, and 3d A₂ respectively.

"A striking characteristic of this family is that in the female the bristles composing the frenulum are consolidated as in the male. The females also possess a frenulum hook, but this is not so highly specialized as that of the male."

CHARACTERS OF THE GENERA.

The main characters of the genera may be found in the position and number of veins of the wings, especially in the hind wings, as can be seen from the figures and descriptions given in the following pages. The venation affords a very constant character and may be relied upon as one of the most important features by means of which the genera may be distinguished. These characters, together with the structure of the palpi, anal tuft, and legs, constitute the differences in the different forms of this homogeneous family.

The genera may be readily separated as follows :

SYNOPSIS OF GENERA.

- Tongue absent or rudimentary.
 - Fore wings with vein Cu_2 absent.
 - Veins R_4 and R_5 stalked..... BEMBEZIA.
 - Veins R_4 and R_5 coalescent..... ZENODOXUS.
 - Fore wings with vein Cu_2 present.
 - Discocellular of hind wings very oblique.
 - Inner margin of hind wings very oblique.
 - Head with long, loose hairs..... EUHAGENA.
 - Head with short hairs..... GAËA.
 - Inner margin of hind wings rounded.
 - Palpi erect, with long hairs..... ÆGERIA.
- Tongue present, long and distinct.
 - Fore wings with 11 veins; R_4 and R_5 coalescent.
 - Hind wings with veins M_3 and Cu_1 from angle of cell.
 - Palpi ascending, with appressed scales..... CALASESIA.
 - Fore wings with 12 veins; R_4 and R_5 on a long stalk.
 - Hind wings with veins M_3 and Cu_1 stalked.
 - Hind legs moderately long; tibiæ hairy.
 - Palpi ascending, reaching vertex of head, with appressed scales.
 - Male with five long anal pencils..... SANNINA.
 - Palpi scarcely ascending, with loose scales.
 - Anal tufts of both sexes straight..... PARHARMONIA.
 - Palpi not reaching top of head, slightly hairy.
 - Anal tuft of male truncate..... VESPAMIMA.
 - Palpi short, straight, hairy..... PALMIA.
 - Hind tibiæ with bunch of hairs at base and end and at base of tarsi.
 - Palpi scarcely reaching top of head.
 - Male with long anal appendage..... ALCATHOË.
 - Hind tibiæ with appressed scales and tufts of hairs at spurs.
 - Palpi loosely scaled.
 - Anal tuft of male wedge-shaped; female with a tuft of hairs on each side anally.
 - SANNINOIDEA.
 - Hind tibiæ hairy or with tuft of hairs at spurs.
 - Palpi slightly hairy, reaching vertex of head.
 - Anal tuft of male fan-like; female brush-like..... SESIA.
 - Hind legs very long, clothed with short hairs.
 - Palpi with very long hairs at base..... PODOSESIA.

- Hind wings with veins M_3 and Cu_1 from end of cell.
 Hind tibiæ with short hairs.
 Palpi ascending, clothed with very long hairs.
 Anal tuft of male straight or with four anal pencils MEMYTHRUS.
 Palpi with short hairs.
 Anal tuft of male divided centrally ALBUNA.
 Hind wings with veins M_3 from middle of cell ; Cu_1 from end of cell.
 Hind legs clothed with very long, thick hairs.
 Palpi with short, loose hairs MELITTIA.

HISTORIC REVIEW OF GENERIC NAMES.¹

The first species belonging to the family at present under consideration were described by Linné in his 'Systema Naturæ,' 1758, and were placed by him in the third division of the genus *Sphinx*, together with a mixture of other species belonging to different genera. In this respect he was followed by many of the earlier writers. No changes regarding the generic position were made by Linné in his subsequent writings.

In 1775 (11) Fabricius divided the Linnæan genus *Sphinx* into three groups, viz : *Sphinx*, *Sesia*, and *Zygæna*, he using the name *Sesia* in the widest sense for practically the same species mentioned by Linné in the third division of the genus *Sphinx*. They are as follows : *Sesia tantalus*, *hylas*, *stellatarum*, *thysbe*, *fuciformis*, *apiformis*, *hæmorrhoidalis*, *culiciformis*, and *tipuliformis*. The first five species are referable to the Sphingidæ and the other four to the Sesiidæ.

In 1777 (21) the same writer restricted the name *Sesia* to *Sphinx* (= *Homæocera*) *melas* of Cramer, a species belonging to an entirely different family from the species originally placed by him in the genus *Sesia*, consequently the restriction is invalid.

During the same year (19) Scopoli erected the following genera : *Spectrum* (= *Sphinx*), with *S. ligustri* and *S. euphorbiæ* as the types ; *Macroglossum*, with *Sphinx stellatarum* as the type ; *Anthrocera*, with *Zygæna filipendulæ* as the type ; and *Trochilium* is used for the species probably referable to the Sesiidæ, but he does not apply the name to any particular species. The diagnosis of the genus *Trochilium* is as follows :

"Alæ pellucidæ abdomen apice sæpius, barbatum. Larva piles albis, exiguus, pubescen. Pupa folliculata."

The description leaves room for considerable speculation as to what species he intended to place in this genus ; the same applies to *Hemaris* as well as to *Sesia*. I would herewith propose to reject the name.

Latreille in 1796 (48) gave a diagnosis of the term *Sesia* which is as follows : "Antennæ renflées vers leur milieu, terminées par un fillet. Antennules

¹ The numbers in parentheses correspond with those of the numbered titles in the Bibliography given at the end of this paper.

pointues. Quelques unes des ailes souvent vitrées abdomen presque cylindrique, garni d'une espèce de brosse à l'extrémité." No particular species is mentioned, but the description may very well be applied to the Sesiidæ.

In 1798 (51) Cuvier made *Sphinx stellatarum* the type of the genus *Sesia*, but this restriction renders *Sesia* synonymous with *Macroglossum* of Scopoli.

Laspeyres in 1801 (52) published a monograph of the European Sesiidæ, using the name *Sesia* in a restricted sense. He excludes all the species not properly belonging to this family.

During the same year Lamarck (53) restricted the genus *Sesia* to *Sphinx* (= *Hemaris*) *fuciformis*, and Schrank (54) used the name *Sesia* in the same sense as Laspeyres, but included under it *Thyris fenestrina*.

In 1805 (62) Latreille adopted the name *Sesia* in the same sense as Laspeyres, or used the name to indicate the species intended to be included in this genus as described by him in 1796.

Hübner in 1806 (65) restricted the name *Sesia* to *S. culiciformis* of Clerck. This is apparently the first restriction, and this species should be considered as the type of the genus, unless we can find another author mentioning a type before this.

Fabricius in 1807 (66) proposed the name *Ægeria* for *apiformis*, *ichneumoniformis*, and *vespiformis*, and *Sesia* for *Sphinx ænotheræ*, *S. stellatarum*, and *S. fuciformis*. The name *Ægeria* as here used is synonymous with *Sesia* of Laspeyres (1801), and *Sesia stellatarum* with *Macroglossum* of Scopoli (1777), while *ænotheræ* and *fuciformis* must be referred back to the Sphingidæ. If we reject the term *Trochilium*, as proposed, *Ægeria* should be used for *apiformis*. In 1809, Latreille (72) again uses the name *Sesia* in the same way as in 1805.

In 1816 (77) Hübner proposed an entirely new classification of the Lepidoptera, and erected for the Sesiidæ the following genera: *Sphecia* for *apiformis* and *bembeciformis*; *Melittia* for *bombiliformis* Cramer. *Bembecia* is used for *hylæiformis*, *empiformis*, *tenthrediniformis*, *scoliaformis*, *tipuliformis*, and a number of other congeneric species. *Synanthedon* and *Conopia* are used for species referable to his genus *Bembecia* and which are all congeneric with the name *Sesia* as used by Laspeyres; *hylæiformis* is the only species not belonging in the series, and *Sphecia* is equivalent to *Ægeria* Fabricius (1807), as used by Newman in 1832.

Leach in 1816 (75) uses the name *Ægeria* for the species referred to it by Fabricius in 1807.

In 1825 Olivier (92) restricted the name *Sesia* to *crabroniformis* (= *apiformis*), but this restriction comes in conflict with that of Hübner (1806), and consequently renders it untenable.

Stephens in 1828 (102) restricted Scopoli's name *Trochilium* to *apiformis*, and gave a good diagnosis of the genus, which, however, does not agree with that of Scopoli, and the restriction comes in conflict with *Ægeria* of Fabricius

(1807). The species placed by Stephens in the genus *Ægeria* are all referable to *Sesia* as restricted by Hübner in 1806.

Meigen in 1830 (109) placed all the species of Sesiidæ in the genus *Setia*, claiming this to be the correct spelling of the name *Sesia*.

In 1832 (113) Newman attempted to prove the identity of *Sphinx asiliformis* with *S. vespiformis* of Linné and erected the genus *Memythrus* for the same. This is the European species, known as *Sciapterion tabaniformis*, with which our *memythrus tricinatus* of Harris is congeneric.

During the same year Newman (114) restricted *Ægeria* to *apiformis* and *bembeciformis*. In the same work he erected the genus *Pyropteron* with *Sesia chrysidiiformis* as the type. *Bembecia* Hübner is used for *Sesia ichneumoniformis*; *Synanthedon* for *S. tipuliformis* and allied species; *Conopia* for *S. myopiformis*, and *Paranthrene* for *vespiformis*. The first four names are synonymous with *Sesia* and the latter must be placed in *Memythrus*.

In 1845 Herrich-Schaeffer (145) restricted *Sesia hylæiformis* to *Bembecia* Hübner. This is the first valid restriction of the genus *Bembecia*, with which our *B. marginata* is congeneric.

Staudinger in 1854 (167) used the name *Trochilium* for the same species as Stephens in 1828, *Bembecia* for *hylæiformis*, and erected the genus *Sciapterion* for *Sphinx tabaniformis* Rott., which is synonymous with *Memythrus vespiformis* as restricted by Newman in 1832.

Walker in 1856 (179) erected the genus *Sannina*, with *S. uroceriformis* as the type, and *Tarsa* for *T. bombyciformis* (= *Memythrus asilipennis*).

In 1868 Grote and Robinson (222) proposed the genus *Zenodoxus*, with *Z. maculipes* as the type.

Möschler in 1876 (271) erected the genus *Grotea* for *Ægeria syringæ* Harris. The name was preoccupied and changed by him in 1879 (285) to *Podosesia*.

In 1881 Hy. Edwards (307) erected the following genera: *Larunda*, with *L. solitudo* as the type; the name, however, was preoccupied in the Geometridæ; *Euhagena* with *E. nebraskæ* as the type; *Albuna* with *Æ. hylotomiformis* (= *pyramidalis*) as the type, and *Carmenta* with *Ægeria pyralidiformis* as the type. The last name is synonymous with *Sesia*.

Hy. Edwards in 1882 (322) erected the genus *Sospita* for *Ægeria quinquicaudata* Ridings (= *Sannina uroceriformis*), but the name being preoccupied was changed by him in the same year (323) to *Phemone*. In the same paper *Alcathoe* was proposed for *Ægeria caudata* Harris, *Fatua* for *Trochilium denudatum* Harris, and *Harmonia* for *Ægeria pini* Kellicott. The latter name was preoccupied in the Coleoptera.

In 1893 Beutenmüller (451) united the genus *Fatua* Hy. Edwards with *Tarsa* Walker. Both are synonymous with *Memythrus*.

The same writer in 1894 (462) proposed *Vespa* for *Bembecia sequoie*

Hy. Edw., and placed *Sciapteron admirandus* in the genus *Tirista* Walker. The preoccupied name *Harmonia* Hy. Edwards (1882) is changed to *Parharmonia* and (464) *Tarsa* is united with *Sciapteron*. In 1896 (494) he changed the preoccupied term *Larunda* Hy. Edwards (1881) to *Gaëa*, and united *Phemonœ* (1882) with *Sannina* Walker (1856). The genus *Palmia* is proposed for *Sciapteron præcedens* Hy. Edw., and *Sanninoidea* for *Ægeria exitiosa* Say.

In 1899 Beutenmüller (517) erected the genus *Calasesia* with *Pyrrhotenia coccinea* as the type.

HABITS OF IMAGO.

The moths with few exceptions fly during the day and in the brightest sunshine. *Bembecia hylæiformis* of Europe is said to be nocturnal, and very likely our common *B. marginata*, which is a closely allied species, has the same habits. I have taken this species at rest on flowers during the day. Late in the afternoon the moths become sluggish and may be readily picked off from flowers or the plants upon which they have been feeding or ovipositing.

They emerge from the pupæ early in the morning and are usually on the wing before 10 A. M. *Sanninoidea exitiosa* (Pl. xxx, Figs. 16 and 17) emerge from about 8 A. M. to 3 P. M., but nearly all hatch between 8 A. M. and 12 M. *Sesia pictipes*, *S. albicornis*, *S. acerni*, *S. bolteri*, *S. scitula*, *S. pyri*, *Memythrus tricinctus*, and *M. simulans* have been observed to hatch before 10 A. M. The imagos copulate soon after the wings are dry and the insect is ready to fly. The copulation may last for half an hour or more, as is the case with *Sanninoidea exitiosa*, and the oviposition may begin in three or four hours after the females emerge.

It has been recorded that if the eggs are not fertilized by the male within twenty-four hours, the female lays them unfertilized to get rid of them. These eggs do not hatch, however. The eggs are pale brown in color; ovate, disc-shaped, with flat bottom. Their surface is minutely shagreened with feebly raised lines forming hexagonal figures.

MIMICRY OF THE IMAGO.

In general appearance in the field the Sesiidæ very much resemble certain wasps, hornets, and flies; so much do they mimic these kinds of insects that they may be readily mistaken for one or the other by a casual observer. Nowhere among insects may there be found better examples of mimicry than in this family; every species, in some way, recalls well-known wasps or flies. Their long, narrow, transparent or opaque, iridescent wings, and bodies banded or ringed with orange, yellow, or red, as well as their flight give them a most striking resemblance to Diptera and Hymenoptera.

Ægeria apiformis, in color and markings, is a very close imitation of the large yellow hornet (*Vespa crabro*) which is found both in this country and Europe. *Vespamima sequoiæ* and *Bembecia marginata* resemble certain kinds of hornets (*Vespa*), owing to the yellow bands on the abdomen. *Memythrus*

polistiformis, *M. dollii*, and *Podosesia syringæ* mimic certain species of paper-wasps belonging to the genus *Polistes*. The female of *Sanninoidea exitiosa* so much resembles the red-banded species of *Pompilus* that it is a very difficult matter to distinguish them when flying in the field.

CHARACTERS OF THE LARVÆ.¹

So far as known, the larvæ of the Sesiidæ are all internal feeders, restricted to the habit of boring in more or less woody stems. There is, therefore, little need for diversity of structure or special adaptations. Indeed, the similarity of habit would tend to convergence in the general structural features. Further there is no need for the development of coloration, as the larvæ feed entirely

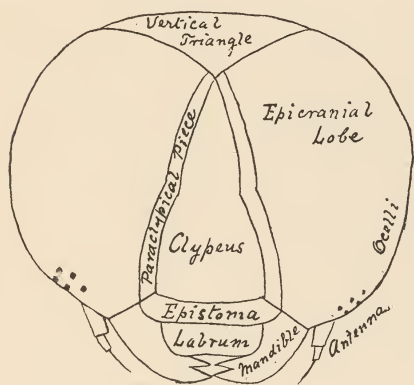


Fig. 4.

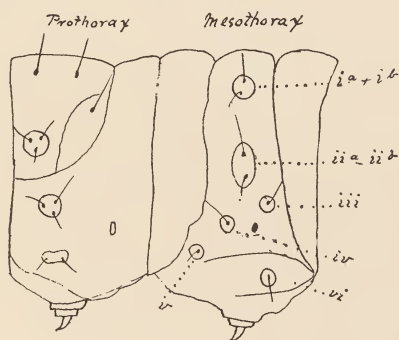


Fig. 5.

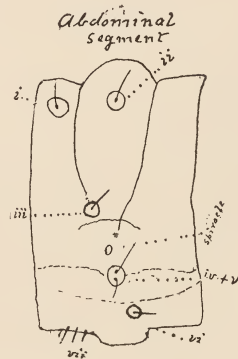


Fig.

concealed. We find all the species white without markings. The result is that the several larvæ are very similar.

The Sesiid larva partakes of the usual structure of the lepidopterous larva, exhibiting a low type, allied to the Cossidæ (also wood-borers) and to certain families of the Microlepidoptera. It comes nearest, perhaps, to some Tortricid forms. The head (Fig. 4) is rounded, with the apex retracted below the prothorax, a very high clypeus, small antennæ and weak ocelli, the lower posterior one often obsolete. The body is normal or somewhat flattened, feet normal, the abdominal ones short or nearly sessile, with well-developed crochets in a single transverse ellipse, narrowly broken on both outer and inner sides, not composed of alternating long and short hooks, but all uniform, the outermost gradually smaller. Contrary to the condition in some other boring larvæ, the shields are not strongly developed, but degenerate. Cervical shield and anal plate large, but weak. Tubercles moderate to obsolete, usually small and degenerate; setæ moderate. The abdominal setæ are arranged as in the Cossidæ, Pyralidæ, and Tortricidæ, tubercles iv and v united, one above the other. The thoracic tubercles (Fig. 5) show certain peculiarities: on each half of the cervical shield are six

¹ Prepared by Dr. Harrison G. Dyar.

setæ (normal); the third on the middle of the posterior margin is cut off by a curved groove or suture, that separates the lower posterior angle of the shield from the rest. The three lower setæ are gathered together at the lower part of the shield on a sort of tubercle. On the meso- and metathorax, tubercles *ia* and *ib* are united, *ii_a* and *ii_b* likewise, but *iv* and *v* are well separated, *iv* being even nearer to *iii* than to *v*; a curious condition. The abdominal segments (Fig. 6) are more or less distinctly divided into three annulets as in Tortricidæ and Pyralidæ. All the tubercles and setæ are single, there never being any development of warts or secondary hairs. The skin is minutely granular. The spiracles are small, slightly elliptical, that of joint 12 the largest, pushed upward a little and directed partly backward, to gain the air space in the burrow behind the larva.

The larvæ of about 20 per cent. of the known species have been under examination. The following table may aid in their identification, though several of them offer no tangible points of difference that I can obtain from the material before me. The specimens are preserved in alcohol or inflated. Most of them are from the collection of the U. S. National Museum and my own collection; five or six more have been handed to me by Mr. Beutenmüller.

Vespa minima sequoiæ is the most generalized form before me. Not only are the tubercles unusually large and distinct, but the clypeus plainly reaches the vertex of the head, separating the epicranial lobes, much as in some leaf-mining Tineidæ. The most specialized form is *Melittia satyriniformis*. This has lost both the tubercles and the segmental annulets. The other species are all closely allied, one scarcely more specialized than another.

SYNOPTIC TABLE OF THE LARVÆ.

Epicranial lobes separated by the paraclypeal pieces, which touch the membranous vertical triangle.	
Body tubercles large, setæ coarse and distinct; crochets of abdominal feet 7 to 10 in the transverse row, the outer part of the row absent.....	<i>Vespa minima sequoiæ</i> .
Epicranial lobes distinctly touching or somewhat broadly contiguous.	
Spiracles brown-ringed, tubercles moderate; segments 3-annulate.	
First annulet (tubercle i) more elevated than the others; crochets of abdominal feet 10 to 14 in a row.	
A black band across between eyes over lower part of clypeus.....	<i>Melittia dollii</i> .
This area more or less brown, the black restricted to a spot above antenna.....	<div style="display: inline-block; vertical-align: middle;"> <i>Sanninoidea exitiosa</i>. <i>Sanninoidea pacifica</i>. <i>Egeria apiformis</i>. </div>
Second annulet (tubercle ii) more elevated than the others.	
Crochets 6 to 9 in a row.	
Crochets large and thick; brownish with distinct paler tubercles.....	<i>Parharmonia pini</i> .
Crochets small and slender, white, tubercles indistinct.....	<i>Sesia pyri</i> .
Crochets 9 to 14 in a row.	
Slender, head small.....	<i>Sesia tipuliformis</i> .
More robust, head larger.	
Lower posterior ocellus as distinct as the others though without pigment.	

Crochets well developed, normal.....	{ <i>Alcathoë caudata</i> .
	{ <i>Sesia scitula</i> .
Crochets very small, reduced.....	<i>Bembecia marginata</i> .
Lower ocellus obsolete, represented by a pale spot.....	{ <i>Sesia albicornis</i> .
	{ <i>Sesia rutilans</i> .
Crochets 15 to 18 in a row; lower ocellus obsolete; epicranial lobes meeting in a point.....	{ <i>Sesia pictipes</i> .
	{ <i>Podosesia syringæ</i> .
Crochets 18 to 22 in a row; epicranial lobes broadly touching.....	{ <i>Memythrus tricinctus</i> .
	{ <i>Memythrus robinie</i> .
Third annulet more elevated than the others.	
Crochets 12-14 in a row.	
Lower posterior ocellus with a slight lens.....	<i>Sesia acerni</i> .
Spiracles black; tubercles absent; segments not annulate, smooth.....	<i>Melittia satyriniformis</i> .

HABITS OF THE LARVÆ.

The larvæ are universally borers, but in the choice of food-plants there is the widest diversity; some bore through and devour solid wood, as do the larvæ of the Cossids; some prefer the pith of woody stems; others are found in the superficial woody layers; still others affect the roots of plants both woody and herbaceous, or are sometimes to be found in the borings made by other insects, as is the case with *Memythrus tricinctus*, *Sesia pictipes*, *S. scitula*, and others. The larvæ are yellowish or dirty white, beset with only a few short hairs. The head and cervical shield are chestnut brown. They hibernate in various stages of growth but do not overwinter in the pupal stage, as far as the species of the northern States are concerned. The larvæ of *Melittia satyriniformis* hibernate fully grown in the cocoons. When fully developed they spin elongate oval cocoons composed of chips cemented together by a gummy secretion or silk. The cocoons are formed in the burrows or in contiguous places.

SYNOPSIS OF FOOD-HABITS OF THE LARVÆ.

Boring in trees.

Under bark of trunks some distance from the base or in the branches:

Maple.....	<i>Sesia acerni</i> .
Maple.....	" <i>corni</i> .
Apple, Pear.....	" <i>pyri</i> .
Dogwood, Oak, Chestnut.....	" <i>scitula</i> .
Alder.....	" <i>americana</i> .
Cherry, Plum, Juneberry.....	" <i>pictipes</i> .
Pine, Redwood (<i>Sequoia</i>).....	<i>Vespa mima sequoiæ</i> .
Pine and Spruce.....	<i>Parharmonia pini</i> .

Under bark at base of trunk or main roots:

Peach, Cherry, Plum, Apricot, etc.....	<i>Sanninoidea exitiosa</i> .
Peach and Cherry.....	" <i>opalescens</i> .
Peach, Cherry.....	" <i>græfi</i> .

- In solid wood of trunks and branches :
- Ash.....*Podosesia syringæ*.
 Ash....." *fraxini*.
 Oak.....*Memythrus simulans*.
 Cottonwood.....*Egeria pacifica*.
 Cottonwood and Locust.....*Memythrus robinia*.
 Poplar....." *dollii*.
 Willow and Poplar....." *tricinctus*.
 Willow.....*Sesia bolteri*.
 Willow....." *albicornis*.
- In solid wood at base of trunks and roots of trees :
- Persimmon.....*Sannina uroceriformis*.
 Willow and Poplar.....*Egeria apiformis*.
 Willow....." *tibialis*.
 Ash, Alder.....*Memythrus asilipennis*.
- Boring in shrubs.
- In solid wood :
- Lilac.....*Podosesia syringæ*.
- In pith of stems :
- Currant, Gooseberry.....*Sesia tipuliformis*.
- In roots :
- Blackberry and Raspberry.....*Sesia rutilans*.
 Blackberry and Raspberry.....*Bembecia marginata*.
 Sumac.....*Melittia gloriosa*.
- Boring in vines and creeping plants.
- In the stems :
- Squash, Pumpkin, and other Cucurbs.....*Melittia satyriniformis*.
 Big-root (*Megarrhiza*)....." *gloriosa*.
- In roots :
- Grape-vine.....*Memythrus polistiformis*.
 Clematis.....*Alcathoe caudata*.
 Clematis....." *korites*.
- Herbaceous perennial plants.
- In roots :
- Strawberry.....*Sesia rutilans*.
- In stem :
- Eupatorium*.....*Sesia lustrans*.
- In borings of other insects :
- Oak-gall (*Andricus cornigerus*).....*Sesia scitula*.
 Oak-gall (*Andricus cornigerus*)....." *rubristigma*.
 Gall on Live Oak....." *querci*.
 Gall on Oak....." *sapygæformis*.
 Gall on Mesquite....." *prosopis*.
 Gall of *Saperda concolor*....." *albicornis*.
 Gall of *Saperda concolor*.....*Memythrus tricinctus*.

CHARACTERS OF THE PUPÆ.

The pupæ are shining brown, armed with transverse rows of teeth or spines on the back of the abdominal segments, by aid of which, when they are in readi-

ness for their final transformation, they gradually work their way through the outer packing of their galleries and the bark, project their anterior segments to at least one half or more of the entire pupal length through the opening, and hold themselves securely during the escape of the moth.

Lintner in 1885 (347) pointed out the sexual characters of the pupæ and found them to be similar to those existing in the Cossidæ. This feature consists (Fig. 7) in the male having two rows of spines on each of the first to sixth abdominal segments inclusive, while in the female there are only two rows of spines on the first to fifth segments inclusive; in other words, the male has two rows of spines on the sixth segment and the female one row. Lintner's observations were based on the pupæ of *Sanninoidea exitiosa* and *Sesia tipuliformis*, and he was not able to say if this feature extended throughout the entire family owing to the limited amount of material at hand. After an examination of the pupæ of *Ægeria apiformis*, *Memythrus robinia*, *M. tricinctus*, *Parharmonia pini*, *Podosesia syringæ*, *Alcathoë caudata*, *Vespamima sequoia*, *Sesia rutilans*, *S. acerni*, *S. scitula*, *S. pictipes*, *S. sapygæformis*, and *S. pyri*, I can assert that the characters observed by Lintner are present in the foregoing named species.

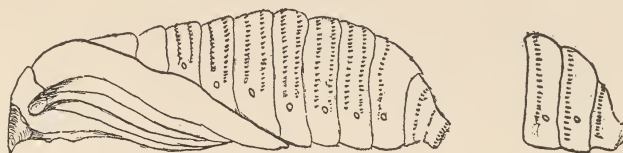


Fig. 7. Male Pupa and last three segments of female Pupa.

DESCRIPTIONS OF GENERA AND SPECIES.

Melittia Hübner.

FIG. 8.

Melittia HÜBNER, Verz. bek. Schmett. 1816, p. 128.

Palpi upturned, clothed with short hairs above and below. Antennæ with fascicles of cilia in the male, clavate, pointed at the tip, simple in the female. Hind tibiæ and tarsi thickly clothed with very long hairs. Fore wings with 12 veins. R_4 and R_5 on a stalk, 2d A very short. Hind wings with 9 veins; M_3 from middle of cell; Cu_1 from end of cell. Abdomen cylindrical, tapering toward the apex. Anal tuft very slight, similar in both sexes.

Type: *Melittia satyriniformis* HÜBNER.

This genus may be at once recognized by the robust form of the species and by their having the hind legs thickly clothed with very long hairs. The range of distribution of the genus is very considerable, being found in North and South America, Africa, and in the Oriental Region to Celebes and Gilolo. Some of the exotic species have the fore wings partly transparent instead of entirely opaque.

SYNOPSIS OF SPECIES.

Small species (24-34 mm.).

Abdomen red with black spots along the back.

Fore wings metallic green.....*satyriniformis*.

Fore wings brown, not metallic.....*snowii*.

Large species (38-45 mm.).

Hind wings orange in the female; transparent in the male.

Abdomen with two segments, yellow above, white beneath.....*gloriosa*.

Abdomen steel blue.....*magnifica*.

Hind wings transparent in both sexes.

Abdomen banded with orange red, pale orange beneath.....*grandis*.

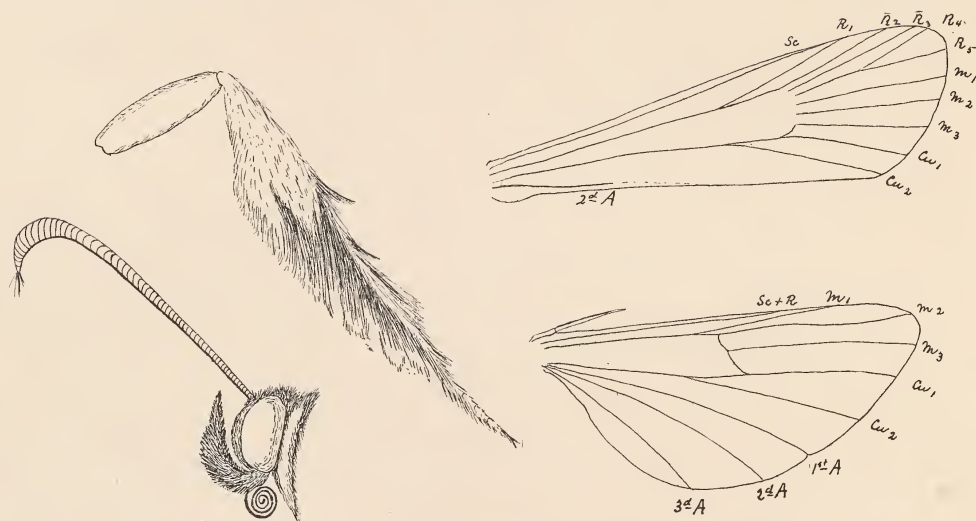


Fig. 8. Head, Hind Leg, and Venation of *Melittia satyriniformis*.

Melittia satyriniformis Hübner.

PLATE XXIX, FIG. 1, FEMALE.

Melittia satyriniformis HÜBNER, Zuträge Exot. Schmett. 1825, p. 17, figs. 453 and 454; BOISDUVAL, Suites à Buffon, Nat. Hist. Lepid. Het. Vol. I, 1874, p. 471; DRUCE, Biol. Cent.-Amer. 1884, Vol. I, Het. p. 67; BEUTENMÜLLER, Journ. N. Y. Ent. Soc. Vol. V, 1897, pp. 34-35; Bull. Am. Mus. Nat. Hist. Vol. IX, 1897, p. 217; *ibid.* Vol. XII, 1899, p. 149.

Sesia satyriniformis WALKER, Cat. Lepid. Het. Br. Mus. Pt. XXXI, 1864, p. 26.

Egeria cucurbitæ HARRIS, New England Farmer, Vol. VII, 1828, p. 33; *ibid.* Vol. XX, 1842, p. 260; Am. Journ. Arts and Sciences, Vol. XXXVI, 1839, p. 310; Ins. Inj. Veget. 1st Edit. 1841, p. 232; *ibid.* 2nd Edit. 1852, p. 253; *ibid.* 3rd Edit. 1862, p. 331; *ibid.* 4th Edit. 1863, p. 330; New England Farmer, Vol. XX, 1842, p. 260; Am. Agricul. Vol. X, 1851, pp. 108-109; CRESSON, Pract. Farmer, 1867, p. 116; SCUDDER, Harris's Corresp. 1869, pp. 161, 285, and 360; RILEY, 2nd Rep. Nox. Ins. Mo. 1870, p. 64; REED, Rep. Ent. Soc. Ontario, 1871, pp. 89-90; THOMAS, 1st Rep. Nox. Ins. Ill. 1878, p. 41; *ibid.* 2nd Rep. 1877 (1878), p. 173; MARTIN, 5th Rep. Nox. Ins. Ill. (Thomas) 1881, p. 107; SAUNDERS, Ins. Inj. to Fruits, 1883, p. 361; *ibid.* 2nd Edit. 1889, p. 361; KENT, Insect Life, Vol. I, 1888, p. 17.

Melittia cucurbitæ WALKER, Cat. Lep. Het. B. Mus. Pt. VIII, 1856, p. 66; PACKARD, Guide Study Ins. 1869, p. 279, and later ed.; BOISDUVAL, Suites à Buffon, Nat. Hist. Lepid. Het. I, 1874,

- p. 469; COOK, 13th Rep. Bd. Agricul. Mich. 1875, p. 116; LINTNER, Count. Gent. Vol. XLIII, 1878, p. 551; *ibid.* XLV, 1880, p. 455; *ibid.* Vol. XLIX, 1884, pp. 397, 477, 497, 517; 2nd Rep. Inj. Ins. N. Y. 1885, pp. 57-68; *ibid.* 4th Rep. 1888, p. 138; *ibid.* 5th Rep. 1889, p. 155; FRENCH, Prairie Farm. Mar. 1st, 1879; COLEMAN, Papilio, Vol. II, 1882, p. 50; HULST, Bull. Brooklyn Ent. Soc. Vol. VI, 1883, p. 10; DEVEREAUX, Rural N. Y. 1883, p. 425; DORAN, Bien. Rep. Com. Agri. Tenn. 1887, p. 207; SMITH, Insect Life, Vol. IV, 1891, p. 30; Rep. Ent. Soc. Ont. 1891, p. 55; OSBORN and MALLEY, Bull. 27 Agricul. Exp. St. Iowa, 1892; WALKER, Insect Life, Vol. IV, 1892, p. 271; SIRRINE, Bull. 75 N. Y. Agri. Exp. St. 1894; MURTFELDT, Colman's Rur. World, 1895, p. 250; WEBSTER, Ohio Farm. 1895, p. 291; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 113.
- Egeria (Melittia) cucurbitæ* PACKARD, Ann. Rep. U. S. Geol. and Geograph. Surv. (Hayden) 1875. (1877), p. 769; FRENCH, Thomas, 2nd Rep. Nox. Ins. Ill. 1878, p. 173.
- Trochilium cucurbitæ* MORRIS, Synop. Lepid. N. Am. 1862, p. 139.
- Trochilium ceto* WESTWOOD, Cab. Orient. Ent. 1848, pl. XXX, fig. 6; SCHAU, Berich. der Ent. für 1848 (1850), p. 125.
- Melittia ceto* WALKER, Cat. Lepid. Brit. Mus. Pt. VIII, 1856, p. 66; MORRIS, Synop. Lepid. N. Am. 1862, p. 335; DRUCE, Biol. Cent.-Am. Vol. I, Het. 1881, p. 32; GROTE, Check List N. Am. Moths, 1892, p. 11; HY. EDWARDS, Papilio, Vol. III, 1883, p. 157; Ent. Amer. Vol. III, 1888, p. 223; BEUTENMÜLLER, Ann. N. Y. Acad. Sci. Vol. V, 1890, p. 204; SMITH, Cat. Ins. N. J. 1890, p. 288; Rep. Ent. N. J. 1890 (1891), pp. 476-480; Insect Life, Vol. V, 1892, p. 85; *ibid.* p. 96; Can. Ent. Vol. XXIV, 1892, p. 130; Rep. Ent. Agricul. Exp. St. N. J. 1892 (1893), p. 499; Bull. No. 94 Agricul. Exp. St. N. J. 1893, pp. 27-40; Econ. Ent. 1896, p. 259; KENT, Insect Life, Vol. II, 1890, p. 283; *ibid.* Vol. III, 1891, p. 337; KELLCOTT, Insect Life, Vol. V, 1892, pp. 82 and 85; Journ. Col. Hort. Soc. 1891, p. 100; Can. Ent. Vol. XXIV, 1892, pp. 43 and 209; COMSTOCK, Man. Study of Insects, 1895, p. 262; WEBSTER, Ohio Farm. 1895, p. 157; SLINGERLAND, Rural N. Y. 1895, p. 261; QUAINANCE, Bull. 34 Agri. Exp. St. Fla. 1896, p. 293.
- Melittia amœna* HY. EDWARDS, Papilio, Vol. II, 1882, p. 53; GROTE, New Check List N. Am. Moths, 1882, p. 11; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 113.
- Male*.—Head metallic green on top; face white, palpi pale orange, whitish at base. Antennæ green black. Thorax metallic olive green, sometimes green brown. Legs orange, tarsi black with white bands, hind legs clothed with very long black hairs inside and with long orange ones outside. Abdomen above orange red with the segments narrowly edged with green posteriorly and a row of black spots along the back; first and second segments dark green like the thorax; underside of abdomen orange. Fore wings dark metallic green with the fringes dark brown black, underside similar but somewhat darker in color. Hind wings transparent, with a decided bluish reflection; veins and narrow outer margin dark green black, fringes dark brown black.
- Female*.—Same as the male in color and markings.
- Expanse: Male, 22-26 mm.; female, 28-35 mm.
- Habitat*.—Canada, United States, Mexico, Central America, and southward to Argentina.
- Larva*.—"Soft and robust, the annulets obsolete, the tubercles absent, spiracle black; otherwise in general normal (*S. exitiosa*). Paraclypeal pieces regular, not narrowed, pointed above, though a little less sharply so than clypeus; rather dark brown. Body segments somewhat creased, not distinctly annulate. Feet with 10 to 12 crochets in each half of the ellipse, less in the posterior half. Tubercles colorless, setæ obsolete; white without marks."—(DYAR, MS.)

This well-known species is popularly known as the Squash-borer owing to the destructiveness of the larvæ to that plant. The moth may be easily recognized by its opaque, metallic green fore wings, red body, and hairs on the hind legs.

It was first named and figured as *Melittia satyriniformis* by Hübner, in 1825,

and three years later Harris redescribed it as *Ægeria cucurbitæ*. In 1848 Westwood gave it the name *Trochilium ceto*, and wrongly recorded it from China; finally, in 1882, Hy. Edwards again redescribed the species as *Melittia amœna*. The name *Melittia satyriniformis* has priority and must be used for the species. Hübner's figure is fairly good and cannot be mistaken for anything else. Harris when redescribing it apparently was not aware of Hübner's work, since Doubleday, in a letter dated Feb. 27, 1841, calls Harris's attention to Hübner's figure and states that *Æ. cucurbitæ* was *M. satyriniformis*. For some reason the names *Ægeria* or *Melittia cucurbitæ* or *ceto* were used in literature and collections up to 1897 when attention was called by me to Hübner's name.

The species is evidently of tropical origin, being found in Mexico, Guatemala, Panama, Argentina, and the lower Amazon. It is widely distributed and injurious in the United States, practically wherever squashes are cultivated. Available records and examination of material show that it has a range extending from Canada and the New England States, southward to the Gulf States, and westward to the region beyond the Missouri River. As far as we are aware, it has not as yet made its appearance on the Pacific coast. The injury the species inflicts has been observed to be particularly severe in recent years in New York, New Jersey, Delaware, Maryland, District of Columbia, Kansas, and Nebraska. Other States in which its destructiveness has been noted include Maine, Massachusetts, Connecticut, Rhode Island, Georgia, Florida, Alabama, Mississippi, Louisiana, Iowa, and Michigan.

The moths make their appearance in the northern States from the beginning of June until early in August. In the southern States they appear in April and May, and are said to be double brooded. In the north they are single brooded; although, according to Kellicott, they are double brooded in Ohio. The eggs are laid upon all parts of a plant, from the roots to the buds and petioles, but chiefly along the stems. The eggs are nearly round, very slightly ovate, disc-shaped, the bottom flat with sharp margin, the top somewhat convex with round edges. In color they are a light chestnut brown. Under the microscope they show a very finely shagreened surface, with feebly raised lines forming hexagonal figures. The shell is thick, chitinous, and very brittle. They hatch in from six to fifteen days after they are deposited. After attaining maturity the larvæ desert the stems and enter the earth, burying themselves to the depth of one or two inches, and form their cocoons in which they transform to pupæ the following spring, in the latitude where they are single brooded.

***Melittia snowii* Hy. Edw.**

PLATE XXIX, FIG. 2, MALE.

Melittia snowii Hy. EDWARDS, Papilio, Vol. II, 1882, p. 53; GROTE, New Check List N. Am. Moths, 1882, p. 11; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 171; *ibid.* Vol. VIII, 1896, p. 114; *ibid.* Vol. XII, 1899, p. 150.

Male.—Head and thorax gray brown; palpi whitish. Abdomen pale orange red along the sides, light brown along the back, and pale gray beneath. Fore wings pale gray brown without any metallic lustre. Hind wings transparent, fringes gray brown. Anterior pair of legs whitish, mixed with light brown hairs, coxæ white. Middle legs gray brown. Hind legs whitish outside; tibiæ orange and tarsi black inside.

Expanse: 25 mm.

Habitat.—Kansas.

Type: One male. Coll. Hy. Edwards. Am. Mus. Nat. Hist.

This species is allied to *M. satyriniformis*, but differs from it by having the fore wings gray brown without any metallic lustre. The life-history is unknown.

Melittia gloriosa Hy. Edw.

PLATE XXIX, FIG. 3, FEMALE.

Melittia gloriosa Hy. EDWARDS, Bull. Brooklyn Ent. Soc. Vol. III, 1880, p. 71; GROTE, New Check List N. Am. Moths, 1882, p. 11; RILEY, Proc. Ent. Soc. Washington, Vol. I, 1888, p. 85; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 171; *ibid.* Vol. VIII, 1896, p. 216; *ibid.* Vol. IX, 1897, p. 216; *ibid.* Vol. XII, 1899, p. 150.

Male.—Head gray on top, face white; palpi white outside, yellowish above. Eyes brown with an olivaceous tint. Collar and thorax gray brown edged with orange posteriorly; on each side in front is an olive yellow shade-mark. Antennæ rufous, pectinations black. Abdomen with first, second, and fourth segments on top gray brown, orange at the sides; third and fifth segments yellow; last two segments and anal tuft blackish with a decided pale blue metallic lustre. The posterior edge of each segment also has a metallic blue margin composed of scales. Underside of abdomen whitish. Fore and middle femora and tarsi brownish, tibiæ with pale orange hairs. Hind legs with long orange hairs inside; black outside with a straw-yellow streak at the base of the tibiæ. Fore wings opaque, gray brown, slightly tinted with olivaceous or orange. Underside washed with orange. Hind wings transparent, veins and inner margin orange, fringes gray brown; underside same as above.

Female.—Like the male, but the hind wings are opaque, bright orange above and below, with the fringes brown.

Expanse: Male, 40–45 mm.; female, 40–58 mm.

Habitat.—Southern California, Arizona.

Type: One female, Coll. Hy. Edwards, Am. Mus. Nat. Hist.

This beautiful species may be known by its large size, robust form, and contrasting colors. In the larval stage it lives in the roots of sumac (*Rhus laurina*) and in the herbaceous climbing stems of big-root (*Megarrhiza*).

Melittia grandis (Strecker).

PLATE XXIX, FIG. 4, FEMALE.

Trochilium grande STRECKER, Can. Ent. Vol. XIII, 1881, p. 156.

Melittia grande GROTE, New Check List N. Am. Moths, 1882, p. 11.

Melittia grandis BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 114; *ibid.* Vol. XII, 1899, p. 151.

Melittia beckeri DRUCE, Ann. and Mag. Nat. Hist. Vol. IX, 1892, p. 276; Biol. Cent.-Am. Vol. II, Het. 1896, p. 325, pl. lxix, fig. 18.

Male.—Head and thorax olive gray brown; palpi yellow. Legs yellow, tarsi ringed with black. Hind legs with long orange hairs inside, and black on top from about the middle of the tibiæ to nearly the tip of the tarsi; underside of hind leg white, spurs black. Abdomen brown along the back, sides orange, or banded with orange; underside pale orange. Fore wings green brown or olive green above, yellowish beneath, green brown at apex. Hind wings transparent in both sexes, veins marked with dirty orange; fringes green brown, marginal line blackish.

Female.—Same as the male, but larger.

Expanse: Male, 38 mm.; female, 50 mm.

Habitat.—Arizona, Texas, and Mexico.

Type: One male, Coll. H. Strecker, Reading, Pa.

Closely allied to *M. gloriosa*, but differs from this species in the color of the abdomen, and by having the hind wings transparent in both sexes. The pectinations of the antennæ are also shorter than in *gloriosa*. The insect described by Mr. Druce as *M. beckeri* is probably the same as *grandis*. Both description and figure agree with the specimen of *grandis* before me.

Melittia magnifica Beuten.

PLATE XXIX, FIG. 5, FEMALE.

Melittia magnifica BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. XII, 1899, p. 151.

Female.—Head blue black; palpi orange, with the extreme tip black. Thorax steel blue, tipped with orange on each side posteriorly. Antennæ blue black, ferruginous towards the tip beneath. Abdomen metallic steel blue black above and below. Two pairs of anterior legs steel blue black (hind pair wanting). Fore wings bright steel blue black, with the inner part broadly light orange. The light part covers more than half the width of the wings to a little beyond the middle, where it curves downward to a point touching the hind angle. Fringes light orange. Hind wings deep orange above and below. Fore wings beneath orange, outer fourth black; fringes orange.

Expanse: 42 mm.

Habitat.—Austin, Texas.

Type: One female, Coll. Am. Mus. Nat. Hist.

This is the most beautiful and brilliant species of the genus, and may be known at a glance by the contrasting orange and blue colors. The hind legs are unfortunately wanting, but these are probably entirely steel blue or mixed with orange. The earlier stages and the male are not known.

Gaëa Beutenmüller.

FIG. 9.

Larunda EDWARDS, Papilio, Vol. I, 1881, p. 182. (Preoccupied.)

Gaëa BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 115.

Palpi rather short, almost porrect, scarcely upturned; thickly clothed with short hairs, third joint bare. Antennæ of male with rather long pectinations, simple and clavate in the female, scarcely pointed at the tip. Hind tibiæ with short hairs above. Fore wings with 11 veins, R_4 and

R_8 stalked. Hind wings subtriangular, inner margin very long and oblique; discocellulars very oblique; vein Cu_2 from cell; M_3 and Cu_1 from angle of cell. Tongue absent. Abdomen sub-cylindrical, anal tuft straight, bunch-like.

Type: *Larunda solitudo* Hy. Edwards.

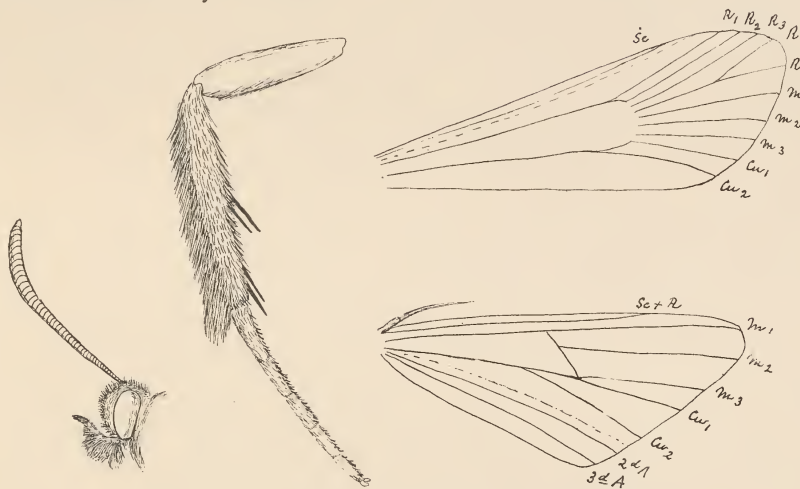


Fig. 9. Head, Hind Leg, and Venation of *Gaëa emphytiiformis*.

SYNOPSIS OF SPECIES.

Fore wings opaque, streaked with red.

Abdomen banded with yellow.....*solitudo*.

Abdomen partly banded with yellow.....*emphytiiformis*.

Gaëa emphytiiformis (Walker).

PLATE XXXI, FIG. 3I, FEMALE.

Egeria emphytiiformis WALKER, Cat. Lepid. Brit. Mus. Pt. VIII, 1856, p. 43; BUTLER, Ann. Mag.

Nat. Hist. Vol. XIV, 1874, p. 408; HY. EDWARDS, Papilio, Vol. I, 1881, p. 206.

Trochilium emphytiiformis MORRIS, Synop. Lepid. N. Am. 1862, p. 438.

Sesia emphytiiformis BOISDUVAL, Suites à Buffon, Nat. Hist. Lep. Het. I, 1874, p. 438.

Bembecia emphytiiformis GROTE, New Check List N. Am. Moths, 1882, p. 11; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. V, 1893, p. 23.

Gaëa emphytiiformis BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 115.

Male.—Head whitish in front, palpi orange, collar dull orange, thorax purplish brown with a yellowish spot at the extreme base of the fore wings and on the scutellum. Abdomen blackish brown, with a yellow band on each segment, the one on the third segment encircling the abdomen. Anal tuft black with a few yellow hairs. Legs red, partly yellow; femora black; tibiae with black stripes. Wings purplish cupreous. Fore wings yellow and partly red in the disc, which is interrupted by the discal mark. Hind wings slightly streaked with red, limpid towards the base.

Female.—Head dirty white in front, palpi and collar orange. Antennæ dull orange, blackish towards the tip. Abdomen with a yellow band on the posterior edge of the second, fourth, and sixth segments, and a trace of a band on the fifth segment. The one on the fourth segment encircles the abdomen. Anal tuft orange, black beneath and at the extreme sides. Legs orange, femora blackish. Fore wings purplish brown with red dash in the cell and a few streaks of the same color beyond the discal mark, between the veins. A short red dash is also situated at the base on the inner margin. Hind wings purplish brown, transparent basally at the middle, red along the

inner margin, especially at the base of the wing, and a little red along the costa outwardly. Wings beneath washed with red.

Expanse : Male, 21 mm.; female, 18 mm.

Habitat.—United States.

Types : Male and female, British Museum. One female (cotype), Coll. Am. Mus. Nat. Hist.

The definite locality for the species is not known, nor is anything known of its life-history.

Gaëa solituda (Hy. Edw.).

PLATE XXIX, FIG. 6, MALE.

Larunda solituda HY. EDWARDS, Papilio, Vol. I, 1881, p. 182; GROTE, New Check List N. Am. Moths, 1882, p. 11; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 171.

Gaëa solituda BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 115.

Male.—Head and thorax brownish, the latter with a yellow stripe on each side; collar, face, and palpi dull yellow. Antennæ dull brown at the base and apex, orange in the middle. Fore and middle legs yellow and orange. Hind legs orange, with a broad yellow band on the tibiæ. Abdomen brownish with six broad pale yellow orange bands; the fourth is carried on beneath the abdomen. Anal tuft black, yellow in the centre. Fore wings opaque, dark brown, with a red and yellow shade from the base along the internal margin, a similar streak of the same color in the cell, interrupted by the discal mark, and continued as rays between the veins to almost the outer margin. Hind wings transparent basally, beyond which the wing is broadly yellow and orange with the veins brown. Fringes of both wings brown. Wings beneath suffused with yellow and orange red between the brown veins, and is much more brilliant than above.

Female.—Similar to the male.

Expanse : Male, 28 mm.; female 32 mm.

Habitat.—Texas and Kansas.

Types : Coll. Hy. Edwards, Am. Mus. Nat. Hist. and B. Neumoegen, Brooklyn Inst. Art. & Sci.

May be easily known by the opaque brown wings with orange and yellow rays and streaks. Earlier stages unknown.

Euhagena Hy. Edwards.

FIG. 10.

Euhagena HY. EDWARDS, Papilio, Vol. I, 1881, p. 181.

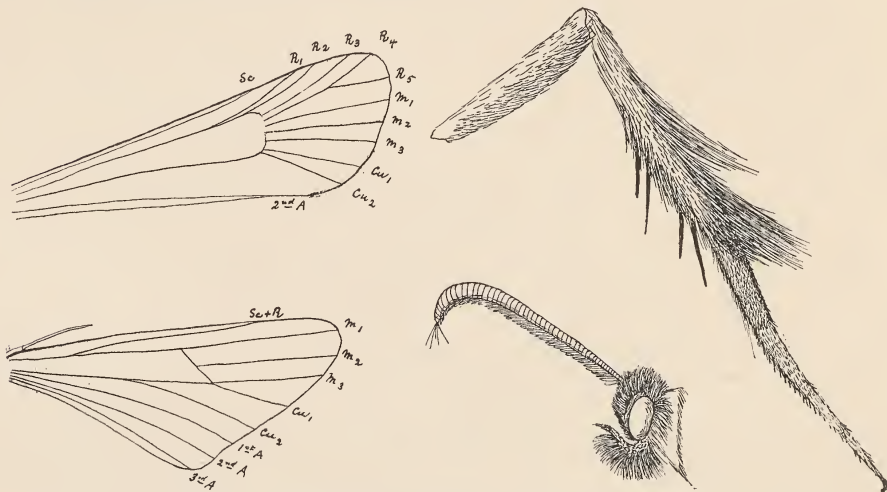


Fig. 10. Venation, Head, and Hind Leg of *Euhagena nebraskæ*.

Palpi slightly upturned, clothed with long hairs beneath on the first and second joints, third joint long and bare. Head, thorax, femora, and tibiæ with long hairs. Antennæ of almost equal thickness throughout, with very long appressed cilia in the male, simple in the female. Tongue absent. Abdomen with appressed hairs; anal tuft flat and fan like in the male, straight and not prominent in the female. Fore wings with 12 veins, R_4 and R_5 stalked. Hind wings with vein Cu_2 from cell, M_3 and Cu_1 from angle of cell. Veins Sc and R coalescent. Discocellulars very oblique.

Type: *Euhagena nebraskæ* Hy. Edwards.

Euhagena nebraskæ Hy. Edw.

PLATE XXXI, FIG. 32, MALE.

Euhagena nebraskæ HY. EDWARDS, Papilio, Vol. I, 1881, p. 181; GROTE, New Check List N. Am.

Moths, 1882, p. 11; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 116.

Pyrrhotænia coloradensis BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. V, 1893, p. 25;

GILLETTE, Bull. 43 Agricul. Coll. Colorado, 1898, p. 6.

Male.—Head black with the face and palpi white, the latter with long black hairs beneath. Thorax velvety black with faint indications of a few whitish hairs. Abdomen deep black with a silvery white ring on the posterior edge of the second, fourth, sixth, and seventh segments, not extending around the under side. Anal tuft black. Legs black, tarsi marked with white. Fore wings rich dark orange red with the costal and outer margins black. Discal mark oblique, black. Fringes brown. Hind wings orange red, with a few blackish scales, margins and discal mark black. Fringes brown. Underside same as above.

Female.—Similar to the male.

Expanse: Male and female, 17–26 mm.

Habitat.—Nebraska and Colorado, October 16–23.

Type: One male, Mus. Com. Zoölogy, Cambridge, Mass. One male (*Pyrrhotænia coloradensis*), Coll. Am. Mus. Nat. Hist.

A well-marked species, easily known by its red wings with black margins. Earlier stages unknown.

Alcathoë Hy. Edw.

FIG. 11.

Alcathoë HY. EDWARDS, Papilio, Vol. II, 1882, p. 53.

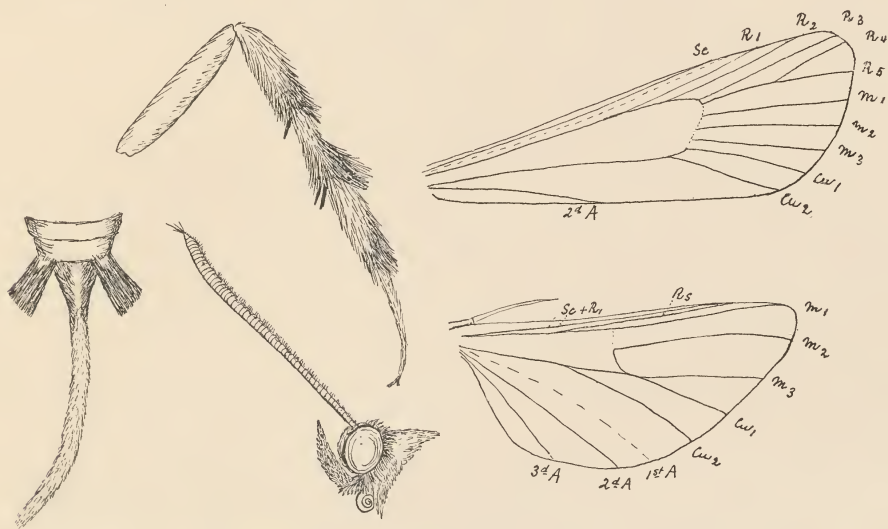


Fig. 11. Anal Appendage of male, Head, Hind Leg, and Venation of *Alcathoë caudata*.

Palpi nearly ascending, scarcely reaching top of head, loosely scaled; second joint very long, third joint very short. Antennæ of equal width, slightly tapering at the tip; very slightly ciliated in the male, simple in the female. Hind tibiæ clothed with a bunch of hairs at each end and a similar bunch at the base of the tarsi, contiguous with the one on the tibiæ. Fore and middle legs without bunches of hairs. Abdomen of the male with a long, hairy tail-like appendage which divides the flat anal tuft. Tongue present, distinct. Fore wings with 12 veins, R_4 and R_5 stalked. Hind wings with vein Cu_2 from cell, M_3 and Cu_1 on a short stalk. Sc and R_1 coalescent. Discocellulars erect.

Type: *Egeria caudata* Harris.

SYNOPSIS OF SPECIES.

Wings orange, with a hyaline spot at the anal angle of hind wings.....*korites*.
Fore wings violaceous; hind wings transparent.....*caudata*.

Alcathoë caudata (Harris).

PLATE XXIX, FIGS. 7 MALE AND 8 FEMALE.

Egeria caudata HARRIS, Am. Journ. Arts and Sciences, Vol. XXXVI, 1839, p. 311; Harris's Corresp. 1869 (Scudder) pp. 249 and 262; WALKER, Cat. Lepid. Brit. Mus. Pt. VIII, 1856, p. 42; PACKARD, Guide Study Insects, 1869, p. 278; THOMAS, 2nd Rep. Nox. Ins. Ill. 1877 (1878), p. 172; LINTNER, 23rd N. Y. State Cab. Rep. 1869 (1872), p. 60; MARTIN, Thomas's 5th Rep. Nox. Ins. Ill. 1881, p. 108.

Trochilium caudatum FITCH, 3rd Rep. Nox. Ins. N. Y. 1856, p. 424; MORRIS, Synop. Lepid. N. Am. 1862, p. 139; BETHUNE, Can. Ent. Vol. I, 1868, p. 18; HY. EDWARDS, Papilio, Vol. II, 1882, p. 53.

Sesia caudata BOISDUVAL, Suites à Buffon, Nat. Hist. Lepid. Het. I, 1874, p. 437.

Alcathoë caudatum HY. EDWARDS, Papilio, Vol. II, 1882, p. 53; GROTE, New Check List N. Am. Moths, 1882, p. 11; BEUTENMÜLLER Ann. N. Y. Acad. Sc. Vol. V, 1890, p. 204; Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 116; *ibid.* Vol. IX, 1897, p. 217; SMITH, Cat. Ins. N. J. 1890, p. 288; KELLCOTT, Can. Ent. Vol. XXIV, 1892, p. 24.

Acalthoë caudata JACK, Garden and Forest, Vol. IV, 1891, p. 496, fig. 77.

Alcathoë cordata RILEY & HOWARD, Insect Life, Vol. IV, 1891, p. 220.

Male.—Head black, face dull rufous; palpi, collar, and antennæ orange. Thorax violaceous or dull rusty red brown. Abdomen black with a slight violet lustre, orange red beneath. Anal tuft black, tail-like appendage bright orange. Legs orange, middle and hind femora black on one side, and the bunch of hairs at the end of the tibiæ also black. Fore wings violet, with a long transparent area at the base sometimes extending to the middle of the wing. Discal mark sometimes slightly indicated, dull orange. Hind wings transparent with an opalescent lustre; discal mark, the very narrow outer margin, and fringes violet black. Undersides of wings somewhat brighter than above.

Female.—Head blackish, palpi and collar orange. Thorax and abdomen above and below blackish. Fore wings violaceous, darker toward the base and lacking the transparent area. Fore legs orange, coxæ black. Middle and hind legs black with the tarsi orange.

Expanse: Male, 20–25 mm.; female, 22–32 mm.

Habitat.—Canada, New England and Middle States south to Florida, westward to Ohio, Illinois, and Michigan.

Types: Two males and one female. Harris Coll., Boston Soc. Nat. Hist.

Larva.—"Normal (*S. exitiosa*), epicranial lobes somewhat broadly touching, gradually divergent above; head rounded and fuller than usual, paraclypeal pieces somewhat pointed above,

widest below; pale brown, almost luteous above, mouth nearly black. Crochets of abdominal feet 9 to 13 in a row, in a rather wide ellipse. Cervical shield cut by a strong line at the angles, broadly brown, the shield itself nearly colorless."—(DYAR, MS.)

Alcathoë caudata var. *walkeri* Neum.

PLATE XXXIII, FIG. 11, MALE.

Alcathoë caudatum var. *walkeri* NEUMOEGEN, Ent. News, Vol. V, 1894, p. 331; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 117.

Male.—Head, body, anal tail-like appendage entirely black and not orange. Legs also black with the tibiæ orange. Antennæ black above, underside and tip dull orange. Wings like the type form.

Habitat.—New York. (Undoubtedly has the same range of distribution as the type form.)

Type: Male. Coll. B. Neumoegen, Brooklyn Inst. Arts and Sci.

The male moth is remarkable for possessing an orange anal appendage, about as long as the abdomen. In the larval stage the species lives in the crown of the roots and larger root branches of the virgin's-bower (*Clematis virginiana* and *C. vitalba*). (Plate XXXVI, Fig. 4.) It undoubtedly also infests other species of plants belonging to the genus *Clematis*. As a rule, several larvæ are found in a single plant and very often bore out the entire crown of the root, causing an apparent lack of vigor of this usually rampant growing plant. The larvæ hibernate in various stages of growth and when fully developed form their cocoons in the burrows. The cocoon is composed of silk mixed with small particles of wood or dirt. The moths emerge from about the middle of June until about the middle of August, thus accounting for the various sizes of larvæ found in the spring of the following year. In Florida the moth emerges in April and May.

Alcathoë korites (Druce).

Sannina korites DRUCE, Biol. Cent.-Am. Vol. I, Het. 1884, p. 34, plate v, fig. 22.

Male.—Head black, palpi orange red below. Antennæ orange with more or less black scales on the stalk. Thorax and abdomen black with a bluish reflection, few red scales on the edge of the patagia and centre of the thoracic disc. Anal tufts and tail-like appendage black. Legs black. Fore wings opaque, orange, with the costa, submedian, and median veins lined with black to beyond the cell. Fringes brown. Hind wings orange with a round hyaline patch at the anal margin, veins partly black. Undersides of wings similar to the above, but lack the black lines on the veins.

Female.—Similar to the male, but wants the anal tail-like appendage, and the red on the thoracic disc is less pronounced.

Expanse: 25–28 mm.

Habitat.—Durango, Colorado, Guatemala, Costa Rica.

Types: Male and female. Coll. U. S. Nat. Mus.

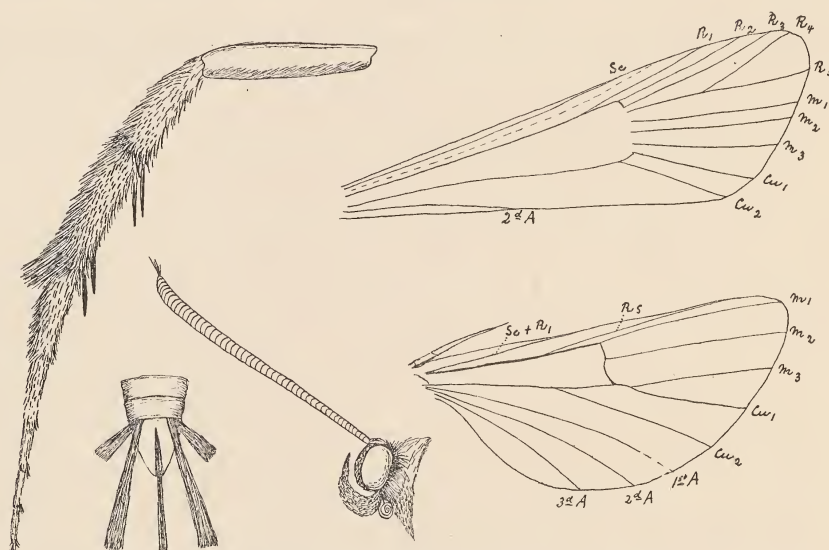
The larvæ live in the roots of *Clematis ligustrifolia*. The moth has all the wings opaque, with a small transparent spot near the anal margin of the hind wings.

Sannina Walker.

FIG. 12.

Sannina WALKER, Cat. Lepid. Brit. Mus. Pt. VIII, 1856, p. 64.*Sospita* HY. EDWARDS, Papilio, Vol. II, 1882, p. 56.*Phemonœ* HY. EDWARDS, Papilio, Vol. II, 1882, p. 97.

Palpi upturned, reaching the top of the head, with appressed scales, not hairy, third joint long; antennæ, filiform, long. Tongue present. Hind and middle tibiæ clothed with short hairs. Last segment of abdomen of the male with four long, diverging pencils arising from the base of the

Fig. 12. Hind Leg, Anal appendages of male, Head, and Venation of *Sannina uroceriformis*.

last segment and a fifth long pencil at the top of the segment. Female with a tuft of hairs at each side of the base of the last segment. Fore wings with 12 veins; R_4 and R_5 stalked. Hind wings with veins M_3 and Cu_1 on a short stalk; Cu_2 from cell. $Sc + R_1$, short. Discocellulars slightly oblique.

Type: *Sannina uroceriformis* Walker.

Sannina uroceriformis Walker.

PLATE XXIX, FIG. 9, MALE.

Sannina uroceriformis WALKER, Cat. Lepid. Brit. Mus. Pt. VIII, 1856, pp. 64 and 259; MORRIS, Synop. Lepid. N. Am. 1862, p. 334; BEUTENMÜLLER, Bull. Am. Mus. Nat. His. Vol. V, 1893, p. 24; *ibid.* Vol. VIII, 1896, p. 17; *ibid.* Vol. IX, 1897, p. 217.

Sannina uroceripennis BOISDUVAL, Suites à Buffon, Nat. His. Lepid. Het. I, 1874, p. 465; HY. EDWARDS, Ent. Amer. Vol. III, 1888, p. 224.

Ægeria? quinquecaudata RIDINGS, Proc. Ent. Soc. Phil. Vol. I, 1862, p. 277; PACKARD, Guide Study Insects, 1869, p. 279, fig. 209.

Sospita quinquecaudata HY. EDWARDS, Papilio, Vol. II, 1882, p. 56.

Phemonœ quinquecaudata HY. EDWARDS, Papilio, Vol. II, 1882, p. 97; GROTE, New Check List N. Am. Moths, 1882, p. 11.

Phemonœ 5-caudata RILEY, Proc. Ent. Soc. Wash. Vol. I, 1888, p. 85; Insect Life, Vol. IV, 1892, p. 332; *ibid.* Vol. VI, 1894, p. 327.

Male.—Head, palpi, and antennæ deep blue black. Thorax deep blue black with a more or

less prominent red dash on each side anteriorly. Underside and legs wholly blue black. Abdomen blue black with the fourth and sometimes also the fifth and sixth segments orange red above. Anal pencils blue black. Fore wings opaque, deep blue black without any markings. Hind wings similar in color, but with a small transparent area at the base. Underside of wings same as above.

Female.—Same as the male, but has only the fourth abdominal segment orange above, and wants the anal pencils.

Expanse : Male and female, 28–32 mm.

Habitat.—Virginia to Florida, westward to Kansas and Montana.

Type: One female. Coll. British Museum.

Both sexes of this species have opaque wings and very much resemble the female of the common Peach-borer (*Sanninoidea exitiosa*), owing to the orange fourth abdominal segment and the blue color. The male of *S. exitiosa* has both wings transparent and lacks the orange on the abdomen, while the female has only the hind wings transparent, except at the base. The larva lives in the centre of the root stalk of the persimmon, at a depth of from 17 to 22 inches below the surface of the ground.

Podosesia Möschler.

FIG. 13.

Grotea MÖSCHLER, Ent. Zeit. Stettin, Vol. XXXVII, 1876, p. 312. (Preoccupied.)

Podosesia MÖSCHLER, Ent. Zeit. Stett. Vol. XL, 1879, p. 246.

Palpi upturned, reaching the top of the head, with long loose hairs on the first and second joints, third joint long and bare. Antennæ thickened towards the tip, which is pointed; with

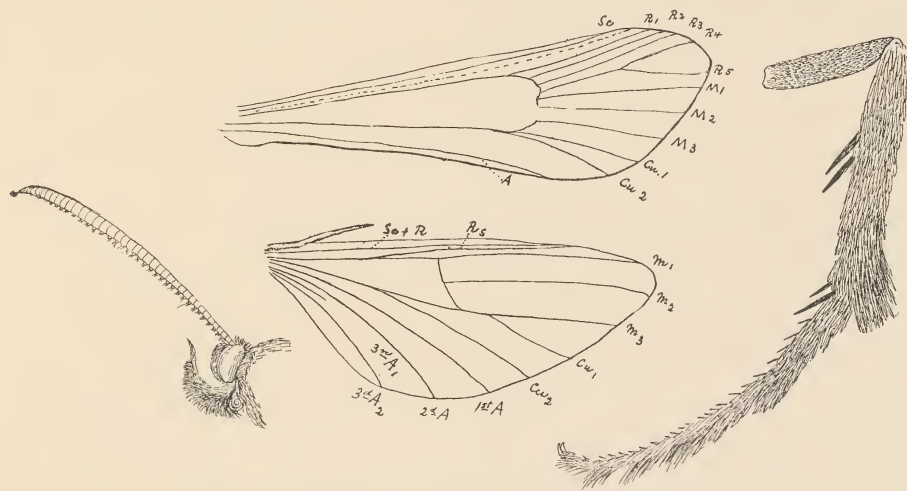


Fig. 13. Head, Venation, and Hind Leg of *Podosesia syringæ*.

fascicles of cilia in the male; simple and shorter in the female. Abdomen constricted at base. Anal tuft very slight, similar in both sexes. At the base of the last segment is a short lateral tuft of hairs. Hind legs very long and clothed with short hairs. Fore wings with 12 veins; R_4 and R_5 stalked. Hind wings with veins M_3 and Cu_1 stalked. $Sc+R$ very long. Vein $3rdA_1$ present. Discocellulars oblique.

Type : *Ageria syringæ* Harris.

SYNOPSIS OF SPECIES.

Abdomen brown or banded with yellow.

Fore wings brown.....*syringæ*.
Fore wings ochreous.....*fraxini*.

Podosesia syringæ (Harris).

PLATE XXX, FIG. 14, FEMALE, AND PLATE XXXIII, FIG. 10, FEMALE, VARIETY.

Ægeria syringæ HARRIS, Am. Journ. Arts and Sciences, Vol. XXXVI, 1838, p. 311; WALKER, Cat. Lepid. Brit. Mus. Pt. VIII, 1856, p. 41; OSBORN, Trans. Iowa Hort. Soc. 1878; THOMAS, 2d Rep. Nox. Ins. Ill. 1877 (1878), p. 174; MARTIN, Thomas's 5th Rep. Nox. Ins. Ill. 1880 (1881), p. 109; FRENCH, Papilio, Vol. I, 1881, p. 106; OSBORN, Iowa State Leader, Nov. 1882.

Trochilium syringæ MORRIS, Synop. Lepid. N. Am. 1862, p. 139; RILEY, Insect Life, Vol. VI, 1894, p. 206.

Sciapteron syringæ HY. EDWARDS, Papilio, Vol. I, 1881, p. 184; PACKARD, Ins. Inj. Forest and Shade Trees, Bull. No. 7 U. S. Ent. Com. 1881, p. 261.

Sesia syringæ BOISDUVAL, Suites à Buffon, Nat. Hist. Lepid. Het. I, 1874, p. 437; HULST, Bull. Brooklyn Ent. Soc. Vol. V, 1882, p. 17, figs.; LUGGER, 2nd Rep. Ent. Agricul. Exp. St. Minn. 1896, p. 38.

Grotea longipes MÖSCHLER, Ent. Zeit. Stettin, Vol. XXXVII, 1876, p. 312.

Podosesia syringæ MÖSCHLER, Ent. Zeit. Stettin, Vol. XL, 1879, p. 246; HY. EDWARDS, Papilio, Vol. II, 1882, p. 53; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Ann. N. Y. Acad. Sc. Vol. V, 1890, p. 204; Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 125; *ibid.* Vol. IX, 1897, p. 219; SMITH, Cat. Ins. N. J. 1890, p. 289; PACKARD, 5th Rep. U. S. Ent. Com. 1890, p. 542; KELLICOTT, Can. Ent. Vol. XXIII, 1891, p. 250; *ibid.* Vol. XXIV, 1892, p. 24; Journ. Columb. Hort. Soc. 1891, p. 61; OSBORN, Iowa Ins. 1893, p. 7 (Rep. Iowa Agricul. Soc. 1892); WEBSTER, Journ. N. Y. Ent. Soc. Vol. V, 1896, p. 72.

Trochilium denudatum OSBORN, Trans. Iowa Hist. Soc. Vol. XV, 1880 (1881), pp. 107-110; Coll. Quarterly, Vol. II, 1879, p. 10; *ibid.* Vol. III, 1880, 14-33; West Stock Journ. and Farm, Aug. 1888; (in error).

Male.—Head black, palpi chestnut red, black beneath. Collar edged with chestnut in front. Antennæ rufous, black above. Thorax deep brown more or less marked with bright chestnut red. Abdomen black, or marked with chestnut brown, sometimes with a small yellow spot on each side of the fourth segment, or with the segments banded with yellow. Femora black, anterior pair of tibiæ orange, tarsi yellow; middle and hind tibiæ black with an orange band. Tarsi yellow, hind pair with a black band above. Fore wings opaque, deep brown, with a violaceous lustre, usually with a rusty red dash at the outer part of the wing below the costa. At the base is a short transparent streak, and marked with red on the costa and inner margin. Underside washed with orange and yellow. Hind wings transparent, yellowish, with an opalescent lustre, veins, discal mark, and margin deep brown, sometimes tinged with red; underside marked with red.

Female.—Similar to the male, but more robust and larger.

Expanse: Male, 25-30 mm.; female, 30-36 mm.

Habitat.—New England and Middle States westward to Colorado and southward to Texas.

Type: One female. Coll. T. W. Harris, Boston Soc. Nat. Hist.

Larva.—"Normal (*S. exitiosa*). Head dark brown; anal segment broadly luteous. Resembles *Sesia pictipes* almost to identity."—(DYAR, MS.)

In color this species is subject to variation. The abdomen is more or less banded with yellow and the thorax is sometimes almost entirely chestnut red. The female deposits her eggs in patches on roughened or knotty places on the bark of ash and lilac. The eggs, according to Hulst, hatch in about six days, and the newly-born larvæ at once eat their way through the bark into the solid wood. They run their channels longitudinally for about eight to ten inches through the wood (Plate XXXVI, Fig. 1). The larvæ pupate in slight cocoons after cutting their way to the bark, of which they leave only the thin outer skin. The pupation usually takes place early in May and the moths emerge in about three weeks.

Podosesia fraxini (Lugger).

PLATE XXX, FIG. 15, FEMALE.

Trochilium fraxini LUGGER, Psyche, Vol. VI, 1891, p. 109, pl. iii, fig. 4; 1st Rep. Ent. Agricul. Exp. St. Minn. 1895 (1896), p. 94, fig.; ALDRICH, Insect Life, Vol. IV, 1891, p. 68.

Ægeria fraxini ORCUTT & ALDRICH, Bull. 22 S. Dak. Agricul. Exp. St. 1891, pp. 80-83, fig. 11.

Podosesia fraxini BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 88; *ibid.* Vol. VIII, 1896, p. 125; *ibid.* Vol. IX, 1897, p. 219.

Male.—Head black between the eyes; face dirty whitish; palpi dull orange, mixed with some black hairs; collar reddish orange in front, yellow behind. Antennæ rufous. Thorax blackish, with the patagia becoming yellow posteriorly; transverse mark at base of thorax yellow. Abdomen black, with a yellow band at the posterior end of each segment, or the last four segments are wholly yellow, or are marked with orange at the sides, sometimes extending almost over the whole surface of the last three. Fore wings opaque except a short transparent and orange brown basal streak, with the discal mark heavier, veins at base sometimes stained with red; underside golden yellow. Hind wings transparent, margin and veins yellowish brown; underside stained with yellow.

Female.—Similar to the male, but more robust and larger.

Expanse: Male, 25-30 mm.; female, 30-35 mm.

Habitat.—Montana, Dakota, Minnesota.

Allied to *P. syringæ*, but differs from it by having ochreous fore wings and the abdomen banded with yellow. The habits and food-plant of the larvæ are the same as those of *syringæ*.

Memythrus Newman.

FIG. 14.

Memythrus NEWMAN, Sphinx vespiformis, An Essay, 1832; Ent. Mag. Vol. I, 1832, pp. 44-47.

Sciapteron STAUDINGER, Sesiis Agri. Berol. 1845; Ent. Zeit. Stett. Vol. XVII, 1856, p. 195.

Tarsa WALKER, Cat. Brit. Mus. Pt. VIII, 1856, p. 61.

Fatua HY. EDWARDS, Papilio, Vol. II, 1882, p. 97.

Palpi strongly upturned, first and second joints very long, with thick hairs, third joint short, with appressed scales. Antennæ more or less pectinate, with fascicules of cilia. Abdomen of the male with anal tuft straight, bunch-like, or with four long pencils at base of last segment. Tongue present. Fore wings 12-veined; veins R_4 and R_5 stalked. Hind wings with veins

M_3 and Cu_1 from end of cell, slightly separated at base; Cu_2 from cell. Discocellulars but slightly oblique. $Sc + R$ very long, touching R_s at extremity. Legs long; tibiæ slightly hairy.

Type: *Sphinx tabaniformis* Rott. (= *vespiformis* Linn.), from Europe.

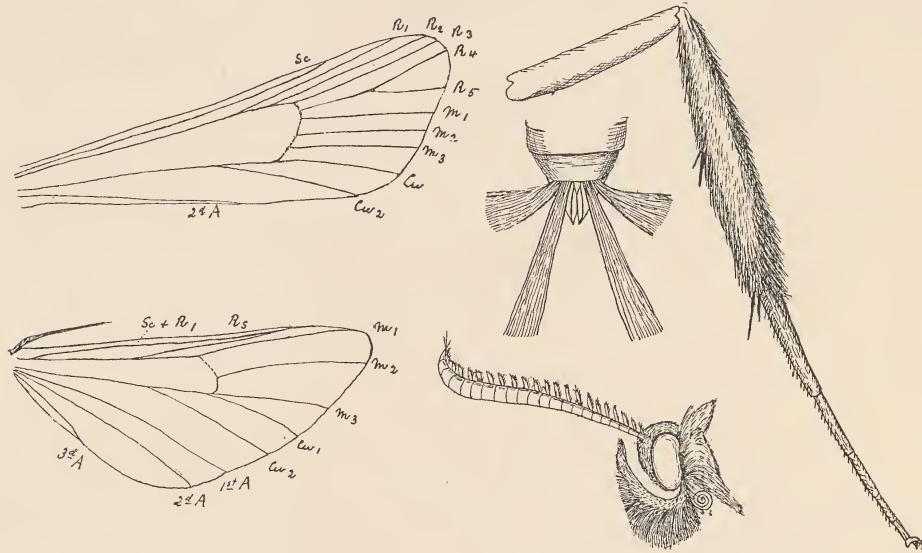


Fig. 14. Venation, Anal appendages of male, Head, and Hind Leg of *Memythrus cupressi*.

The genus is somewhat variable as regards the secondary sexual characters of some of the species. The male of *M. denudatus* has all the wings transparent, and *M. polistiformis* and *M. cupressi* have four anal pencils.

SYNOPSIS OF SPECIES.

Fore wings opaque, violet black.

Hind wings transparent.

Abdomen with four (♂) or three (♀) yellow bands.....*tricinctus*.

Abdomen with all the segments banded with yellow.....*denotatus*.

Fore wings opaque, brown.

Hind wings with outer border running into the wings.

Abdomen with a yellow band on the second segment.....*scepsiformis*.

Abdomen with segments red and yellow.....*admirandus*.

Hind wings opaque, except at base.

Abdomen brown, sometimes with one or more yellow bands.....*dollii*.

Like *dollii*, but the abdomen and thorax is chestnut brown.....var. *castaneus*.

Hind wings transparent.

Abdomen with a narrow yellow band on each segment.....*seminole*.

Abdomen with a yellow band on the second and fourth segments, male with four anal pencils.....*polistiformis*.

Fore wings ochreous yellow.

Abdomen yellow, three basal segments black.....*robinia*.

Abdomen with first segment black, male with four anal pencils.....*cupressi*.

Fore wings with a transparent area at the hind angle in both sexes.

Abdomen orange.....*palmii*.

Abdomen yellow.....*simulans*.

Fore wings of male transparent; female opaque with transparent area at hind angle.

Abdomen with narrow yellow bands.....*asilipennis*.

Memythrus tricoloratus (*Harris*).

PLATE XXXIII, FIG. 9, FEMALE.

Egeria tricoloratus HARRIS, Am. Jour. Arts and Sciences, Vol. XXX, 1839, p. 310; WALKER, Cat. Lepid. Brit. Mus. Pt. VIII, 1856, p. 41; KELLCOTT, Bull. Buffalo Soc. Nat. Sc. Vol. IV, 1882, p. 62; PACKARD, Ins. Inj. Forest and Shade Trees (Bull. 7 U. S. Ent. Com.), 1881, p. 121; 5th Rep. U. S. Ent. Com. 1890, p. 444; KELLCOTT, Can. Ent. Vol. XIII, 1881, p. 3; FYLES, Can. Ent. Vol. XVI, 1884, p. 220; Rep. Ent. Soc. Ontario 1884 (1885), p. 24.

Trochilium tricoloratus MORRIS, Synop. Lepid. N. Am. 1862, p. 138.

Sesia tricoloratus BOISDUVAL, Suites à Buffon, Nat. Hist. Lepid. Het. 1874, p. 436.

Sciapteron tricoloratus GROTE, New Check List N. Am. Moths, 1882, p. 11; DAVIS, Ins. Life, Vol. IV, 1891, p. 66; KELLCOTT, Can. Ent. Vol. XXIV, 1892, p. 209; Ins. Life, Vol. V, 1892, p. 82; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 120; *ibid.* Vol. IX, 1897, pp. 213 and 218.

Male.—Head black, collar yellow in front and at each side behind; palpi black, yellow inside towards the tip. Antennæ blue black above, ferruginous beneath. Thorax black, with a yellow spot at the base of the fore wings and one on each side posteriorly. Abdomen black, with a slight bluish reflection. Second, fourth, and last two segments with a yellow band above and below. Anal tuft black. Legs black, middle and hind tibiæ partly orange, the latter yellow inside; tarsi orange. Fore wings opaque, violet black with a short transparent streak at the base; inner margin streaked with red at the base, sometimes also along the costa for a short distance; underside yellow at the base. Hind wings transparent, with a narrow outer margin and discal mark violet black, as are also the veins. Underside with discal mark and costal margin orange red or same as above.

Female.—Like the male, but with only three yellow bands on the abdomen instead of four, one on each of the second, fourth, and sixth segments.

Expanse: Male and female, 25–28 mm.

Habitat.—Canada, New England, and Middle States westward to Ohio and Michigan.

Type: One male, Coll. T. W. Harris, Boston Soc. Nat. Hist.

Larva.—"Normal (*S. exitiosa*), the epicranial lobes broadly contiguous for a space equal to three times the width of the paraclypeal pieces; clypeus with the lower angles broadly truncate; paraclypeal pieces broadest below, not strongly defined. Head luteous, mottled with large patches of brown; labrum, band over epistoma, and sutures of clypeus black. Body fleshy white, smooth, the annulets though present, not sharp; subventral folds distinct. Cervical shield faintly luteous, the curved line brown; anal flap very faintly luteous with a subdorsal brown tubercle. Tubercles nearly obsolete, setæ short. Feet with 18 to 22 crochets in a row."—(DYAR, MS.)

This species may be easily recognized by the opaque, purplish fore wings and yellow bands on the abdomen. In the larval stage it lives in the branches and small trunks of willows and poplars and also in the galls of *Saperda concolor* which infest these trees. The channel made by the larva is from three to five inches long, two larvæ often being in one channel. The larvæ before transforming prepare a way for final escape, which they carefully guard by means of a silken membrane, reinforced by fragments of wood. They then line the burrows near the entrance with silk and spin a tough cocoon composed of silk and chips of wood. The moths emerge during June and July and the larvæ overwinter in the food-plants, forming chrysalids in May and June.

Memythrus denotatus (*Hy. Edw.*).

PLATE XXX, FIG. 1, FEMALE.

Albuna denotata HY. EDWARDS, Papilio, Vol. II, 1882, p. 55; GROTE, New Check List N. Am. Moths, 1882, p. 12.

Sciapterion denotata BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 171; *ibid.* Vol. V, 1893, p. 24; *ibid.* Vol. VIII, 1896, p. 119.

Male.—Head black; palpi black with the tips inside yellow; collar glistening, violet black, narrowly edged with yellow in front and at each side behind; orbits of eyes pure white. Antennæ steel blue above, ferruginous beneath. Thorax blue black, edged on each side behind with a little yellow. On each side beneath the fore wings is a small yellow spot which is contiguous with the one at the base of the wings. Abdomen deep black with a bluish reflection, second, third, fourth, and last two segments, each with a broad yellow band. Anal tuft black with a very few yellow hairs. Legs black, middle and hind tibiæ partly orange; the latter yellow inside; tarsi orange. Fore wings opaque, violet black with a transparent streak at the base, and reddish along the inner margin. Hind wings transparent, with an opalescent lustre; discal mark and narrow margin violet black. Fore wings beneath washed with yellow and traces of an orange discal mark.

Female.—Same as the male, with the abdomen more robust.

Expanse: Male and female, 26–28 mm.

Habitat.—Montana, Colorado, Texas.

Types: One male and two females. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Closely allied to *M. tricinatus* of which it may possibly be a variety. It agrees with it in color except that there is a yellow band on each segment in both sexes, while in *tricinatus* the male has four and the female three bands.

Memythrus robiniaë (*Hy. Edw.*).

PLATE XXIX, FIG. 15, FEMALE.

Sciapterion robiniaë HY. EDWARDS, Bull. Brooklyn Ent. Soc. Vol. III, 1880, p. 72; PACKARD, Ins. Inj. For. and Sh. Trees, Bull. No. 7 U. S. Ent. Com. 1881, pp. 103, 127, 261; 5th Rep. U. S. Ent. Com. 1890, p. 360; GROTE, New Check List N. Am. Moths, 1882, p. 11; RILEY, Proc. Ent. Soc. Wash. Vol. I, 1888, p. 85; Insect Life, Vol. II, 1889, p. 18; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1892, p. 171; *ibid.* Vol. VIII, 1896, p. 120; *ibid.* Vol. IX, 1897, p. 218.

Male.—Head and palpi yellow. Collar black edged with yellow in front and behind. Antennæ orange brown. Thorax deep black; the patagia tipped with yellow at the posterior edge, and a transverse curved line across the hind part of the thorax. Abdomen with the first three segments above and below deep black, second with a narrow yellow band and the third with only a slight yellow ring at the posterior edge; remaining segments yellow. Legs yellow, femora washed with black. Fore wings orange brown with the veins somewhat darker and sometimes indication of a discal mark. Hind wings transparent with the narrow margin and veins orange brown. Fore wings beneath golden yellow, discal mark light yellow.

Female.—Same as the male but larger.

Expanse: Male, 26 mm.; female, 30–36 mm.

Habitat.—Nevada, California, and Washington.

Types: One male and three females. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Larva.—Same as that of *M. tricinatus*.

Said to be very destructive in California and Nevada to the white poplar (*Populus alba*) and to the downy poplar (*Populus canescens*), both of these trees being introduced into the Pacific States as ornamental trees. It also destroys the locust (*Robinia pseudacacia*).

In Nevada the moth appears in July and on the Pacific coast during March and April.

***Memythrus cupressi* (Hy. Edw.).**

PLATE XXX, FIG. 2, MALE.

Sciapteron cupressi HY. EDWARDS, Papilio, Vol. I, 1881, p. 183; GROTE, New Check List N. Am. Moths, 1882, p. 11; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 121.

Male.—Vertex of head, palpi, and antennæ rich orange; face light orange. Collar purplish brown, edged in front with rich orange brown and on each side behind with golden yellow. Thorax rich brown with the patagia orange brown, edged within with golden yellow; on the thorax behind is a golden yellow transverse mark and a tuft of the same color mixed with orange on each side posteriorly. Abdomen with basal segment black, the second deep orange, edged posteriorly with yellow, the third yellow edged with orange behind; the remaining segments deep yellow as are also the four anal pencils. Legs orange, femora washed with black, hind tibiæ yellow and orange; tarsi orange. Fore wings purplish brown, yellow at the base and an orange streak along the middle to the indistinct discal mark; underside washed with golden yellow, darker outwardly. Hind wings transparent, veins purplish brown, margin and fringe violet brown, with an orange line along the inner margin to the angle. Underside orange along the costa, and the orange along the inner margin more prominent than above.

Female.—Similar to the male, but lacks the four pencils at the end of the abdomen. The fore wings are somewhat paler, and the second to fifth segments inclusive are broadly orange anteriorly, yellow behind, remaining segments yellow. Underside of thorax orange and yellow. Collar orange, broadly yellow behind. Palpi bright yellow, orange at the base. Legs orange and yellow.

Expanse: Male and female, 30–35 mm.

Habitat.—Utah, Colorado, Arizona.

Type: One female. Coll. B. Neumoegen, Brooklyn Inst. Arts and Sci.

Closely allied to *M. robinia*, but the male has four anal pencils which are absent in *robinia*. The abdomen has the first segment black, the second deep orange, and the remaining ones yellow. *Robinia* has the first three segments black. The early stages are not known.

***Memythrus polistiformis* (Harris).**

PLATE XXX, FIGS. 7 MALE AND 8 FEMALE.

Aegeria polistiformis HARRIS, Am. Pomol. Soc. 1854, p. 10; GLOVER, Rep. U. S. Com. Pat. 1854 (1855), p. 80, pl. vi, figs.; Rep. U. S. Com. Agricul. 1867 (1868), p. 72, figs.; *ibid.* 1873 (1874), p. 159; Month. Rep. Dept. Agricul. 1873, p. 496; WALSH, 1st Rep. Nox. Ins. Ill. 1868, p. 24; PACKARD, Guide Study Ins. 1869, p. 278 and other editions; RILEY, 3rd Rep. Nox. Ins. Mo. 1871, p. 75, figs.; BETHUNE, Can. Ent. Vol. V, 1873, p. 218; THOMAS, 2nd Rep. Nox. Ins. Ill. 1877 (1878), p. 171; PERKINS, 5th Rep. Vermont Bd. Agricul. 1878, p. 263; MARTIN, 5th Rep. Nox. Ins. Ill. 1880 (1881), p. 108; STOUT, Rep. Kansas Hort. Soc. 1879 (1880), p. 88; SAUNDERS, Ins. Inj. Fruit, 1883, p. 229; *ibid.* 1889, p. 229.

Trochilium polistiformis FITCH, 3d Rep. Nox. Ins. N. Y. 1856, p. 387.

Egeria polistæformis GLOVER, Month. Rep. Dept. Agricul. Oct. 1867, p. 329.

Sciapteron polistiformis GROTE, New Check List N. Am. Moths, 1882, p. 11; BEUTENMÜLLER, Ann. N. Y. Acad. Sc. Vol. V, 1890, p. 204; *ibid.* Vol. VIII, 1896, p. 22; *ibid.* Vol. IX, 1897, p. 218; DAVIS, Proc. Mich. Hort. Soc. 1894 (1895), p. 78; LUGGER, 4th Rep. Ent. Agricul. Exp. St. 1898 (1899), p. 55, figs.

Male.—Head on top dull rufous, face dirty whitish, palpi rufous. Antennæ rufous beneath, black above. Thorax brown, sometimes rufous on the patagia. Abdomen brown with a violaceous reflection and a yellow ring on the second and fourth segments; anal segment with four orange brown pencils, the lateral ones shorter. Legs orange, femora black. Fore wings opaque brown black, with a violaceous lustre, and a short transparent streak at base. Underside washed with orange basally. Hind wings transparent, border narrow, violet brown, discal mark very narrow, oblique, inner margin at base orange. Underside with margin marked with orange.

Female.—Much heavier than the male, with simple antennæ and no anal pencils. The thorax wants the rufous color on the patagia and the abdomen is somewhat darker.

Expanse: Male, 21–30 mm.; female, 30–37 mm.

Habitat.—Vermont, New York, New Jersey, North Carolina, South Carolina, Kentucky, Illinois, Missouri, Michigan, Ohio, Minnesota.

Types: Two males and one female. Coll. T. W. Harris, Boston Soc. Nat. Hist.

This moth very much resembles one of the large paper-wasps (*Polistes*) and on that account was named "*Polistes-shaped*" (*polistiformis*). The sexes are dissimilar, the male having four long pencils on the last abdominal segment. The insect is destructive to the roots of the wild and cultivated grapes, especially in the southern States, and is popularly known as the Grape-root Borer.

Memythrus sceansiformis (Hy. Edw.).

PLATE XXX, FIG. 3, FEMALE.

Sciapteron sceansiformis HY. EDWARDS, Papilio, Vol. I, 1881, p. 183; GROTE, New Check List N. Am. Moths, 1882, p. 11; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 121.

Male and Female.—Head deep purplish brown, palpi and collar rusty brown. Antennæ blackish, dull orange beneath and at the tip. Thorax purplish black brown, patagia with a small yellow dot at the tip, sometimes a yellow stripe on each side and one at the base. Abdomen purplish black with the second segment narrowly edged with yellow behind. Legs black, tibiæ and tarsi marked with orange. Fore wings blackish or brownish, with a bluish purplish reflection, ferruginous along the inner margin, and sometimes with a small yellow spot at the base. Hind wings transparent with a broad outer border, the opaque portion being carried a considerable distance into the wing. Discal mark distinct, violet black; base of wing at inner margin ferruginous. Underside of wings same as above, orange basally.

Expanse: 25–30 mm.

Habitat: Maryland, Kansas, Texas.

Types: Male and female. Coll. B. Neumoegen, Brooklyn Institute Arts and Sciences.

Memythrus simulans (Grote).

PLATE XXIX, FIG. 16, FEMALE.

Trochilium (Sciapteron) simulans GROTE, Bull. Brooklyn Ent. Soc. Vol. III, 1881, p. 78; Bull. U. S. Geog. Surv. Hayden, Vol. VI, 1881, p. 257.

Sciapteron simulans GROTE, New Check List N. Am. Moths, 1882, p. 11; 18th Rep. Ent. Soc. Ont. 1887 (1888), p. 81; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 121; *ibid.* Vol. IX, 1897, pp. 214, 218.

Trochilium simulans BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 171.

Trochilium luggeri HY. EDWARDS, Psyche, Vol. VI, 1891, p. 108, pl. iii, fig. 3; LUGGER, Bull. 43, Agricul. Exp. St. Minn. 1895, p. 189, fig.; 1st Rep. Ent. Agricul. Exp. St. Minn. 1895 (1896), p. 93, figs.

Head black, orbits of eyes bright lemon yellow; palpi black at base, otherwise lemon yellow. Antennæ black with a steel blue reflection. Collar lemon yellow. Thorax black, patagia at tips, a transverse posterior mark and spot at base of fore wing, yellow. Anterior coxæ yellow; femora black marked with a little yellow; tibiæ yellow and orange; tarsi orange. Abdomen black with a broad bright yellow band on the posterior edge of each segment, those of the posterior segments much widened; sometimes the first to fourth segments have the bands very narrow and the last three segments are wholly yellow. Underside similar to the above. Fore wings thinly clothed with dull orange brown scales, bordered with deep brown black along the costa and inner margin, discal mark slightly indicated. At the base of the wing is a short transparent streak, and at the hind angle is a transparent area. Underside paler than above, washed with orange. Hind wings transparent, with an opalescent lustre, margin very narrow brown.

Expanse: 27-35 mm.

Habitat.—Rhode Island, New York, Pennsylvania, New Jersey, Illinois, Ohio, Minnesota.

Type: One female. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

In the larval stage this insect lives in the solid wood of the red oak. The moth appears from late in May until July.

Memythrus palmii (Hy. Edw.).

PLATE XXIX, FIG. 17, FEMALE.

Fatua palmii HY. EDWARDS, Can. Ent. Vol. XIX, 1887, p. 145; Ent. Amer. Vol. III, 1888; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 171.

Sciapteron palmii BEUTENMÜLLER, Bull. Amer. Mus. Nat. Hist. Vol. VI, 1894, p. 366; *ibid.* Vol. VIII, 1896, p. 122.

Male.—Top of head and face black; palpi orange, black at base; collar orange; antennæ pectinate, black, orange at base, fulvous at tip. Thorax black; patagia at tips, a large spot at posterior part, and a small spot at base of fore wing light orange. Abdomen rich orange, with a narrow black ring at the anterior part of each segment. Legs rich orange, hind femora partly black. Fore wings rich purplish brown, slightly orange at the base and along the costa to nearly the middle of the wing; above the anal angle, between veins C_1 and C_2 , is an opalescent, transparent streak; underside washed with orange basally. Hind wings dull yellowish, transparent, strongly opalescent; veins, discal mark, and narrow margin violet brown; underside, with the veins and line in outer margin, orange.

Female.—Similar to the male, with the antennæ simple.

Expanse: Male, 32 mm.; female, 43 mm.

Habitat.—Florida (Enterprise).

Type: One female. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Nothing is known about the early stages of this species, but probably, like its congener (*M. simulans*), it lives in oak. It is allied to *M. simulans* but the abdomen is bright orange instead of lemon yellow.

Memythrus asilipennis (Boisd.).

PLATE XXX, FIG. 0, MALE, AND FIG. 11, FEMALE.

- Sesia asilipennis* BOISDUVAL, Guérin-Ménéville, Cuvier's, Règne Animal, Vol. II, 1829, p. 496, pl. lxxxiv, fig. 3 (male); Suites à Buffon, Nat. Hist. Lepid. Het. I, 1874, p. 391; WILSON, Treat. Ins. Gen. Syst. Encyclo. Brit. 1835, p. 244, pl. ccxxxvi.
- Ageria asilipennis* MARTIN, 5th Rep. Nox. Ins. Ill. (Thomas), 1880 (1881), p. 109; HY. EDWARDS, Ent. Am. Vol. III, 1888, p. 224.
- Trochilium vespipenne* HERRICH-SCHÄFFER, Ausseurop. Schmett. 1850-58, p. 57, fig. 217 (female).
- Trochilium denudatum* HARRIS, Am. Journ. Arts and Sciences, Vol. XXXVI, 1839, p. 310 (female); Ins. Inj. Veget. 1841, p. 231; *ibid.* 2nd Ed. 1852, p. 252; 3rd Ed. 1862, p. 330; MORRIS, Synop. Lepid. N. Am. 1862, p. 138; KELLCOTT, Can. Ent. Vol. XIII, 1881, p. 8.
- Sesia denudata* BOISDUVAL, Suites à Buffon, Nat. Hist. Lep. Het. I, 1874, p. 435.
- Ageria denudatum* PACKARD, Ins. Inj. For. and Sh. Trees, Bull. No. 7 U. S. Ent. Com. 1881, p. 138.
- Fatua denudatum* HY. EDWARDS, Papilio, Vol. II, 1882, p. 97.
- Fatua denudata* GROTE, New Check List N. Am. Moths, 1882, p. 11; BEUTENMÜLLER, Ann. N. Y. Acad. Sc. Vol. V, 1890, p. 204; SMITH, Cat. Ins. N. J. 1890, p. 288; PACKARD, 5th Rep. U. S. Ent. Com. 1890, p. 540.
- Tarsa denudata* BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. V, 1893, p. 22; *ibid.* Vol. VIII, 1896, p. 124; *ibid.* Vol. IX, 1897, p. 219; LUGGER, 1st Rep. Ent. Agricul. Exp. St. Minn. 1895 (1896), p. 96, pl. v, fig. 51 (no name).
- Tarsa bombyciformis* WALKER, Cat. Lepid. Brit. Mus. Pt. VIII, 1856, p. 61 (male); BOISDUVAL, Suites à Buffon, Nat. Hist. Lepid. Het. I, 1874, p. 463.

Male.—Head blackish, palpi pale yellowish white beneath, rufous above. Antennæ rufous. Collar edged with dull orange brown. Thorax brown, patagia rufous, hind portion with a yellow transverse line. Abdomen dull brown black with a very narrow yellow ring at the posterior edge of each segment above and below. Legs orange, femora black. Fore wings transparent with narrow brown borders and discal mark which is marked with rufous; underside marked with orange brown on the opaque portions of the wings. Hind wings transparent, with a very narrow brown border; underside similar to the upper.

Female.—Like the male, but the fore wings are opaque, deep brown, violaceous, with an oblique reddish discal mark and a triangular transparent area above the hind angle. Abdomen like that of the male, but more robust, with the second segment marked with red above. Antennæ simple.

Expanse: Male, 30-38 mm.; female, 32-44 mm.

Habitat.—New Hampshire to Florida, westward to Minnesota and southward to Texas.

Type: One female (*M. denudatum*). Coll. T. W. Harris, Boston Soc. Nat. Hist.

The male may be readily distinguished from all other Sesiids by the character of the antennæ, which have very long pectinations. The wings are transparent in this sex, while in the female the fore wings are opaque, except a small triangular patch at the hind angle, thus looking like a different species. The male was described as *Sesia asilipennis* and *Tarsa bombyciformis* and the female as *Trochilium vespipenne* and *T. denudatum*. In the larval stage the insect lives in the roots of the ash and alder.

Memythrus dollii (Neum.).

PLATE XXX, FIG. 4, FEMALE.

- Sciapteron dollii* NEUMOESEN, Ent. News, Vol. V, 1894, p. 330; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 122; *ibid.* Vol. IX, 1897, p. 218.

Male.—Head black, orbits of eyes pale; palpi and collar rufous. Antennæ rufous. Thorax black brown, sometimes with the patagia rufous. Abdomen black, fourth to last segments rufous behind, second and fourth segments with a yellow ring; sometimes all the segments are banded; underside dull orange behind. Legs dull orange, femora black. Fore wings rich brown with a violaceous reflection, orange at the extreme base. Underside washed with dull orange brown. Hind wings opaque, brown, transparent basally and beyond the cell below the costa; sometimes transparent with discal mark and rather broad outer border, brown; underside with a dull orange tinge.

Female.—Very similar to the male, but more robust, with the antennæ simple, black above, rufous below and at base and tips.

Expanse: Male, 28 mm.; female, 35–40 mm.

Habitat.—New York, New Jersey, Pennsylvania, Illinois.

Types: Male and female. Coll. B. Neumoegen, Brooklyn Institute of Arts and Sciences.

Larva.—"Normal (*S. exitiosa*), the epicranial lobes touching in a broad point; clypeus bulging, depressed at vertex, paraclypeal pieces small, narrowed centrally. Brown with large darker patches on the sides, jaws, a band across between antennæ and clypeal sutures black. Thorax somewhat enlarged and flattened, abdominal segments prominent dorsally, incisures well marked. Annulets moderate, the first the largest. Shields pale, the cervical cut by a dark curved line. Abdominal feet with crochets 10 to 15 in a row. Tubercles obsolete; setæ fine, moderate."—(DYAR, MS.)

Memythrus dollii var. *castaneus* (*Beuten.*).

PLATE XXX, FIG. 5, MALE, AND FIG. 6, FEMALE.

Sciapteron dollii var. *castaneum* BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IX, 1897, p. 213.

Male and Female.—Like the type form but the thorax and abdomen are bright chestnut brown, instead of black brown.

Expanse: Male, 30 mm.; female, 40 mm.

Habitat.—Kansas, Texas.

Types: Two males. Coll. Hy. Edwards, Am. Mus. Nat. Hist. One female. Coll. B. Neumoegen, Brooklyn Inst. Arts and Sciences.

In the larval stage this species lives in the solid wood of young poplars. The moth is subject to variation. In some individuals the abdomen is banded with yellow and the hind wings are transparent with the exception of the outer margin. The variety *castaneus* is bright chestnut brown instead of dark brown like the type form.

Memythrus seminole (*Neum.*).

PLATE XXX, FIG. 22, FEMALE.

Sciapteron seminole NEUMOESEN, Ent. News, Vol. V, 1894, p. 330.

Female.—Head and eyes light brown; palpi light brown with dark tips. Collar light brown with reddish edge. Thorax brown with a yellow line on the patagia, and a transverse one of the same color at the posterior edge of thorax. Abdomen light reddish brown, segments edged with yellow; the first three edged with black. Legs yellowish above, brown below, with reddish brown hair. Fore wings chestnut brown with a yellow basal spot, a streak along the middle, and a reddish tint along the inner margin. Fringes concolorous. Hind wings transparent, opalescent; costa, veins, discal mark, terminal lines, and fringes reddish brown. Underside of fore wings light chestnut shading into reddish brown and a yellow basal area.

Expanse : 40 mm.

Habitat.—Florida.

Type : One female. Coll. B. Neumoegen, Brooklyn Institute Arts and Sciences.

The male is unknown and the type is the only specimen known to exist in collections.

Memythrus admirandus (*Hy. Edw.*).

PLATE XXXI, FIG. 33, MALE.

Sciapteron admirandus HY. EDWARDS, Papilio, Vol. II, 1882, p. 54; GROTE, New Check List N.

Am. Moths, 1882, p. 11; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 171.

Tirista admirandus BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 88.

Tirista admiranda BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 123.

Male.—Head with hairs between the eyes and palpi orange; orbits of eyes white. Antennæ fuscous. Color narrowly yellow in front. Thorax dull brown with patagia narrowly edged with yellow; on each side in front at the base of wings a large reddish patch; hind part of thorax with a yellow, transverse line. Abdomen with basal segment brownish black, second light yellow, third orange, fourth yellow, and last three orange edged with yellow. Underside orange, with the third segment yellow as above. Anal tuft dull brown. Legs orange. Fore wings dull brown with a violaceous reflection and a small yellow spot at the base. Underside like the upper, but washed with orange at the base. Hind wings transparent, veins and margin dull brown, the opaque color running into the wing to the cell, between veins M_3 and Cu_1 , orange at the extreme base on the inner margin. Underside similar to the upper, but the inner margin has an orange line.

Expanse : 30 mm.

Habitat.—Texas.

Type : One male. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Palmia Beuten.

FIG. 15.

Palmia BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 123.

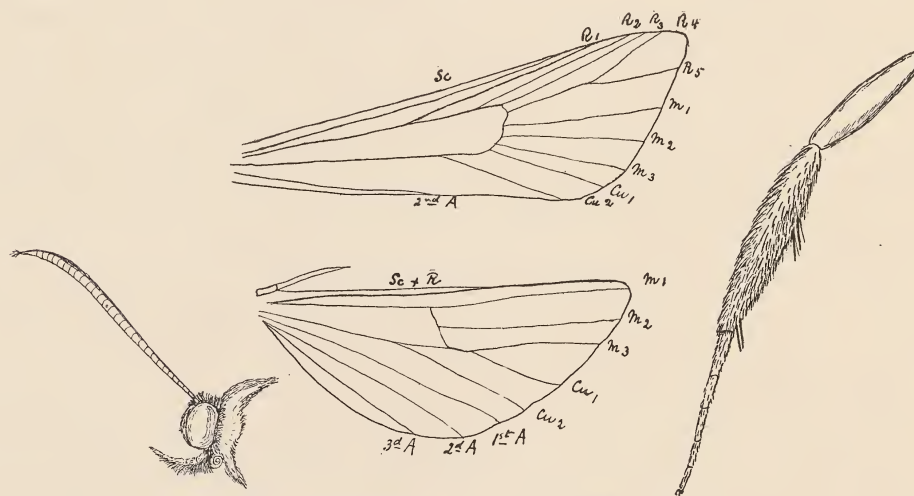


Fig. 15. Head, Venation, and Hind Leg of *Palmia precedens*.

Head small, palpi short, straight, not upturned. Antennæ clavate in the female, pointed at the tip. Abdomen slender. Hind femora with short hairs. Fore wings with 12 veins; R_4 and R_5 stalked. Hind wings pointed at apex; veins M_2 and Cu_1 stalked; $Sc + R$; Rs absent.

Type : *Sciapteron precedens* Hy. Edwards.

Palmia præcedens (Hy. Edw.).

PLATE XXX, FIG. 9, FEMALE.

Seiapteron præcedens HY. EDWARDS, Papilio, Vol. III, 1883, p. 155; Ent. Amer. Vol. III, 1888, p. 223.*Palmia præcedens* BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 123.

Female.—Head and thorax brown black, the latter with red stripe on each side. Antennæ orange, black at the tips. Abdomen black with some red scales laterally at the base, last three segments and anal tuft bright lemon yellow. Legs orange red with a broad black band on the tibiæ; hind tarsi lemon yellow. Fore wings brown with a narrow transparent streak stained with red along the internal margin. Hind wings brown, transparent at their base. Beneath both wings are streaked with red and yellow.

Expanse: 30 mm.

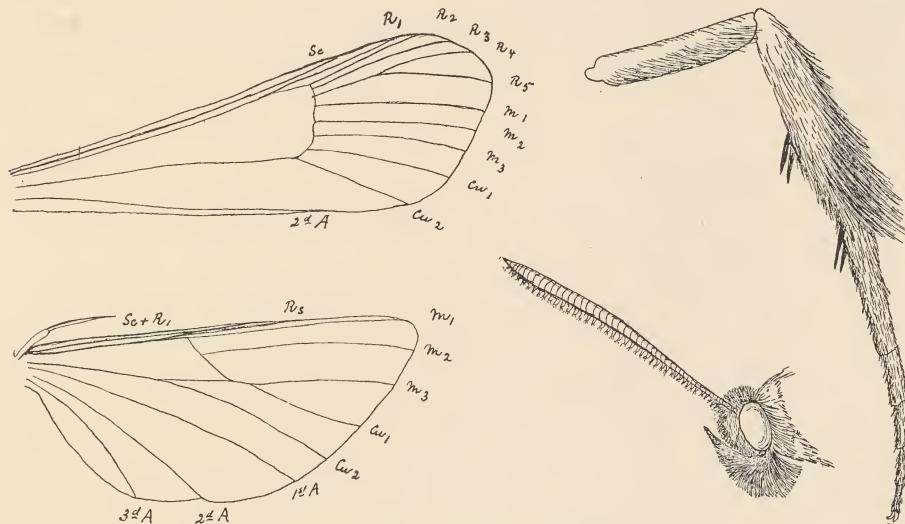
Habitat.—North Carolina.

Type: One female. Coll. Neumoegen, Brooklyn Inst. Arts and Sciences.

The yellow tip to the abdomen will at once serve to distinguish the species. The type is the only specimen known to exist in collections and nothing whatever is known about the life-history of the species. The male is unknown.

Ægeria Fabricius.

FIG. 16.

Ægeria FABRICIUS, Illiger, Mag. Insectenk. Vol. VI, 1807, p. 288 (in part).*Sphecia* HÜBNER, Verz. bek. Schmett. 1816, p. 127.Fig. 16. Venation, Head, and Hind Leg of *Ægeria apiformis*.

Head small, palpi upturned and scarcely reaching the top of the head, clothed with long hairs towards the base. Antennæ short and thick, about as long as the thorax, strongly pectinate in the male, simple in the female. Body robust, abdomen cylindrical, blunt at tip, male with anal tuft not prominent. Tibiæ thickly clothed with short hairs. Femora and tarsi not hairy. Tongue absent. Fore wings with veins R_4 and R_5 stalked. Hind wings with veins M_3 and Cu_1 from angle of cell or on a very short stalk. Discocellulars very oblique.

Type: *Sphinx apiformis* Clerck.

SYNOPSIS OF SPECIES.

Thorax with a yellow line on the patagia.

Abdomen banded with yellow.....*tibialis*

Abdomen entirely, except the first two segments.....*pacifica*

Thorax with a large yellow spot on each side anteriorly.....*apiformis*

Ægeria apiformis (Clerck).

PLATE XXIX, FIG. 13, FEMALE.

GOEDART, Insect. Method., 1685, fig. 15; LINNÉ, Fauna Suecica, 1st Ed. 1746; SCHÄFFER, Insect. circa Ratisbonam, 1867, pl. cxi, figs. 2 and 3.

Sphinx apiformis CLERCK, Icones Insect. Rariorum, 1759, pl. iv, fig. 2; LINNÉ, Fauna Suecica, 2nd Ed. 1761, p. 289; Systema Naturæ, 12th Ed. Vol. I, Pt. II, 1767, p. 804; HOUTTYN, Edit. Linné Nat. Hist. Besch. der Dieren, Vol. II, Pt. I, 1767, p. 461; GEOFFROY, Hist. Abreg. des Insect. 1762, Vol. II, p. 83; DE GEER, Mém. Hist. Ins. Vol. II, 1771, p. 227, pl. vii, fig. 11; MÜLLER, Nat. Syst. Pt. V, 1773, p. 644; FUESSLY, Verz. bek. Schweiz. Ins. 1775, p. 33; Mag. Liebh. Entom. Vol. I, 1778, p. 120 and p. 132, pl. i, fig. A; Neues Mag. Liebh. Ent. Vol. II, 1785, p. 200; *ibid.* Vol. III, p. 142; ROTTENBURG, Naturforscher, Vol. VII, 1775, p. 108; HARRIS, Exposit. Engl. Ins. 1766, pl. iii, fig. 7; MÜLLER, Zool. Danicæ Prodrum. 1776, p. 116, No. 1311; SULZER, Abgek. Geschich. Insect. 1776, p. 152, pl. xx, fig. 6; GÖTZE, Abhand. Gesch. Ins. Vol. II, 1778, p. 163, pl. ii, fig. 11; ESPER, Europ. Schmett. Vol. II, 1779, p. 122, pl. xiv, fig. 2, and p. 207, pl. xxix; LANG, Verz. Schmett. Augsburg, 1782, p. 73; *ibid.* 2nd Ed. 1789; RETZIUS, Genera et Spec. Insect. 1783, p. 33; BORKHAUSEN, Nat. Europ. Schmett. Vol. II, 1789, p. 132; VIEWEG, Tabel. Verz. Churmark Brandenburg, einheim. Schmett. 1789, p. 14; SCHRANK, Neues Mag. Ent. (Fuessly), Vol. II, 1789; DE VILLERS, Linnæi Entomol. Fauna Suecica, Vol. II, 1789, p. 99; BRAHM, Handb. Oekonom. Ins. Vol. I, 1791, p. 13; SCHWARZ, Raupenkalender, Vol. II, 1791, p. 390; JUNG, Verz. Bekant. Schmett. 1791, p. 4; DONAVAN, Nat. Hist. Brit. Ins. Vol. II, 1793, p. 55, pl. xxv; *ibid.* 2nd Ed. 1804; BORKHAUSEN, Rhein. Mag. Naturkunde, Vol. I, 1793, p. 312; ROSSI, Mantissa Insect. Vol. II, 1794, p. 15; LEWIN, Tran. Linn. Soc. London, Vol. III, 1797, pp. 1-2, pl. i, figs. 1-5; STEWART, Elem. Nat. Hist. 1802, p. 139; *ibid.* 1817, p. 149; HAWORTH, Cat. Brit. Lepid. 1802, p. 5; PANZER, Syst. Nomenclat. Insect. 1804; SHAW, Gen. Zoöl. Vol. VI, Pt. I, 1806, p. 222.

Sesia apiformis FABRICIUS, Syst. Ent. 1775, p. 549; Species Insect. Vol. II, 1781, p. 156; Mant. Insect. Vol. II, 1787, p. 99; Ent. Syst. Vol. III, Pt. I, 1793, p. 382; ZSCHACH, Museum N. G. Leskeanum, Ent. Syst. Fabricii, 1788, p. 96; GMELIN, Linné Syst. Nat. Vol. I, Pt. V, 1789, p. 2380; ROSSI, Fauna Etrusca, Vol. II, 1790, p. 164; GMELIN, 13th Rev. Edit. Linné, Syst. Nat. Vol. I, Pt. IV, 1791, p. 2388; BERGSTRÄSSER, Epitome Ent. Fabricianæ, 1797, p. 147; SCHRANK, Fauna Boica, Vol. II, 1801, p. 233; LASPEYRES, Sesia Europæ, 1801, p. 7; WALCKENER, Hist. Ins. environs Paris, Vol. II, 1802, p. 281; OLIVER & LATREILLE, Nouv. Dict. Hist. Nat. Vol. XX, 1803, p. 445; *ibid.* Vol. XXXI, 1819, p. 105, pl. xxiv, fig. 2; PANZER, Icones Insect. Ratisb. Vol. II, 1804, tab. cxi, figs. 2 and 3; LATREILLE, Hist. Nat. Crus. and Ins. Vol. XIV, 1805, p. 156; Gen. Crust. et Insects, Vol. IV, 1809, p. 211; TURTON, Linné Syst. Nat. Vol. III, 1806, p. 180; ILLIGER, Mag. Ins. Kunde, 1807, p. 294 (quotes Latreille); OCHSENHEIMER, Schmett. Europa, Vol. II, 1808, p. 121; DALMAN, Kongl. Vetén. Acad. Handl. 1816, p. 217; GOEDART, Hist. Nat. Lepid. France, Vol. III, 1821, pp. 78-80, pl. xxi, fig. 1; RISSO, Hist. Nat. Europ. Merind. Vol. V, 1826, p. 243; MEIGEN, Handb. fur Schmetterlinglieb. 1827, p. 87; TIGNY & GUERIN, 3rd Edit. Hist. Nat. Ins. Vol. IX, 1828, p. 116, pl. xvi, fig. 1; BOITARD, Man. Ent. Hist. Nat. Insects, 1828, p. 319; BOISDUVAL, Europ. Lep. Ind. Metho. p. 31, 1829; TREITSCHKE,

Schmett. Europa, Vol. X, 1834, p. 116; LUCAS, Hist. Nat. Lepid. Europa, 1834-35, p. 106, pl. liii; *ibid.* 2nd Edit. 140; LAMARCK, Hist. Nat. sans Vert. Vol. IV, 1835, p. 230; GUERIN, Dict. Hist. Nat. Vol. IX, 1839, p. 42; RATZEBURG, Forst. Ins. Pt. II, 1840, pp. 78-81, pl. iii, fig. 3 and pl. iv, fig. 4; ZELLER, Isis, 1840, p. 142; ZETTERSTEDT, Insecta Lapponica, 1840, p. 918; BOISDUVAL, Genera Index Meth. 1840, p. 44; HERING, Ent. Zeit. Stett. 1941, p. 28; HEYDENREICH, Cat. Lep. Europa, 1843, p. 19; *ibid.* 2nd Edit. 1846, 3rd Edit. 1851; EVERSMAAN, Fauna Lepid. Volga-Ural, 1844, p. 100; BLANCHARD, Hist. des Insect. Vol. II, 1845, p. 353; BLISSON, Ann. Soc. Ent. France, 2 Ser. Vol. IV, 1845 (1846), pp. 208 and 219; FIXEN, Bull. Soc. Nat. Mosc. 1849, Vol. XXIII, p. 170; NICKERL, Synop. Lepid. Fauna Böhmen, 1851, p. 25; SCHMIDT, Verz. Preussich. Schmett. 1851, p. 8; LEDERER, Verh. Zool.-Bot. Gesell. Wien, 1852, p. 67; CZERNAY, Bull. Soc. Nat. Mosc. 1854; CHENU & LUCAS, Encycl. Hist. Nat. 1856, pp. 5, 12, 239; SCHLEICHER, Verh. Zool.-Bot. Gesell. Wien, 1856, p. 655; GLASER, Naturgesch. der Insect. 1857, p. 145; Die Kleinthiere Nutz. und Schad. 1886, p. 186; ANON. Ann. Soc. Ent. Belg. Vol. I, 1857, p. 37; CZERNY, Verh. Zool.-Bot. Gesell. Wien, Vol. VII, 1857, p. 219; NEWMAN, Brit. Moths, 1860, p. 16, fig.; DOUBLEDAY, Syn. List Brit. Butt. and Moths, 1859, p. 3; 3rd Edit. 1862; WOOD, Ins. at Home, 1872, p. 426; MEEK, Ent. Month. Mag. Vol. X, 1873, p. 162; MARSHALL, Ent. Month. Mag. Vol. X, 1873, p. 181; TASCHENBERG, Forst. Insectkund. 1874, p. 289; Pract. Insectkund., Pt. III, 1880, p. 13; GIRARD, Metamorph. des Insect. 1874, p. 234; CARR, The Entomol. Vol. XXVII, 1894, p. 234.

Ægeria apiformis FABRICIUS, Syst. Glossatum. Illiger, Mag. Insectenk, Vol. VI, 1807, p. 288; LEACH, Edinb. Encyclo. Vol. IX, 1815, p. 131; SAMOUELLE, Entomol. Compendium Brit. Ins. 1819, p. 245; *ibid.* 1824, p. 245; NEWMAN, Ent. Mag. 1832, p. 78; GREENE, Ent. Week. Intell. 1856, p. 18; MEYRICK, Handb. Brit. Lepid. 1895, p. 563.

Sphecia apiformis HÜBNER, Verz. bek. Schmett. 1816, p. 127; HUMPHREY & WESTWOOD, Brit. Moths and their Transf. 1857, p. 34, pl. vii, figs. 2 and 16; STEPHENS, Cat. Brit. Lepid. 1856, p. 28; Man. Brit. Butt. and Moths, Vol. I, 1857, p. 102; HUMPHREYS, Gen. Brit. Moths, Vol. I, 1859, p. 13, pl. iv, figs. 1, 2; BUCKLER, Larva of Brit. Butt. and Moths, Vol. II, 1887, p. 123, pl. xxvii, fig. 1.

Setia apiformis MEIGEN, Syst. Besch. Europ. Schmett. Vol. II, 1830, p. 103.

Trochilium apiformis STEPHENS, Brit. Ent. Vol. II, Haust. 1828, p. 137; Syst. Cat. Brit. Ins. 1829, p. 34; Nom. Brit. Ins. 1829, p. 39; CURTIS, Brit. Ent. Vol. VIII, 1823-40, p. 372; *ibid.* 2nd Edit. 1859; RENNIE, Conspect. Butt. and Moths in Britain, 1832, p. 27; WOOD, Index Entomol. 1839; *ibid.* 1845, p. 14, pl. iv, fig. 23; *ibid.* 1854; HERRICH-SCHÄFFER, Schmett. Europ. Vol. II, 1845, p. 61; CURTIS, Gen. Brit. Lepid. 1858, pl. viii, fig. 30; SIEVERS, Horæ Soc. Ent. Ross. 1863, p. 140; HEYLÆRTS, Tijd. voor Ned. Ent. Vereen, 2 Ser. Vol. V, 1870, p. 147; KANE, The Entomol. Vol. XXVI, 1873, p. 272; BOISDUVAL, Suites à Buffon, Nat. Hist. Lepid. Het. I, 1874, p. 387; BEUTENMÜLLER, Ann. N. Y. Acad. Sc. Vol. V, 1890, p. 204; RATZEBURG, Waldverd. und Feinde, Pt. III, 1893, p. 761 (JUDEICH & NITSCHKE); HARRISON, The Entomol. Vol. XXVII, 1894, p. 358; PAYNE, The Entomol. Vol. XXVIII, 1895, p. 51.

Trochilium apiforme DUNCAN, Nat. Hist. Brit. Moths, 1836, p. 171, pl. xiii, fig. 1; *ibid.* 1846; STAUDINGER, Sesiis Agri. Berolinensis, 1854, p. 41; Stett. Ent. Zeit. Vol. XVII, 1856, p. 193; MANN, Wien. Ent. Monatsch. Vol. I, 1857, p. 146; *ibid.* Vol. VI, p. 365; GRAAF, Tidj. Ent. Ned. Vereen, 1863, p. 155; DUBOIS, Lepid. de la Belgique, Vol. I, 1874, pl. iii, fig. 1; FREY & WULLSCHLEGEL, Mit. Schweiz. Ent. Gesell. Vol. IV, 1874, p. 212; STAUDINGER, Horæ Soc. Ent. Ross. Vol. XIV, 1878 (1879), p. 301; GROTE, New Check List N. Am. Moths, 1882, p. 11; BREHM, Thierleben, Vol. I, Pt. IV, Ins. 1884, p. 375; HUGUENIN, Mit. Schweiz. Ent. Gesell. Vol. VII, 1887, p. 318; HOFFMANN, Die Gross-Schmett. Europas, 1887, p. 28, pl. xiv, fig. 1; Raup. Europ. 1893, p. 32, pl. ix, fig. 4; SMITH,

Cat. Ins. N. J. 1890, p. 288 ; STEINERT, Deutsch. Ent. Zeit. (Berlin), Vol. V, 1892, p. 399 ; HAASE, Ent. Zeit. Stett. Vol. LIV, 1893, p. 29-30 ; CARADJA, Deutsch. Ent. Zeit. (Berlin), Vol. VI, 1893, p. 189 ; TUTT, Brit. Moths, 1896, p. 345, pl. xii, fig. 4 ; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 118 ; *ibid.* Vol. IX, 1897, p. 218 ; *ibid.* Vol. XII, 1899, p. 158.

Trochilia apiformis HEINEMANN, Schmett. Deutsch. und Schweiz, Pt. I, 1859, p. 120 ; KRANZ, Schmett. um München, 1860, p. 23 ; WILDE, Syst. Besch. der Raupen, 1861, p. 89.

Bembecia apiformis NOWICKI, Enum. Lepid. Haliciæ Orient. 1860, p. 23.

Sphinx vespiformis HUFNAGEL, Berlin Mag. Vol. II, 1766, p. 114.

Sphinx crabroniformis DENIS and SCHIFFMÜLLER, Verz. Schmett. Wien, 1775, p. 305 ; ENGRAMELLE, Papilio, Europ. Vol. III, 1782, p. 32, pl. xci, fig. 121 ; SCHNEIDER, Neu. Mag. Liebh. Entomol. Pt. IV, 1792, p. 429 ; HUBNER, Sam. Europ. Schmett. Schwarmer, 1796, p. 23, pl. i, fig. 51.

Sesia crabroniformis OLIVIER, Encycl. Method. 1825, pl. lxvii, fig. 4 ; DUMERIL, Dict. Sci. Nat. Vol. XLIX, 1827.

Male.—Head and palpi lemon yellow. Antennæ black above, ferruginous below. Thorax brown, with a large lemon yellow spot on each side in front, and a similar one on each side of the posterior part. Sometimes the spots are united by a yellow dash along the patagia. Abdomen with a very broad yellow band on the anterior part of each segment, except the last two, which are entirely yellow ; posterior parts of segments narrowly brown. Legs yellow, slightly washed with brown. Fore wings transparent, with narrow light brown borders and discal mark. Hind wings transparent, with outer margin very narrow, brown. Discal mark absent.

Female.—Much more robust than the male, with the second and fourth abdominal segments usually wholly brown. Otherwise similar to the male.

Expanse : Male, 30-35 mm. ; female, 40-45 mm.

Habitat.—Europe, Siberia, United States westward to Nevada.

Larva.—"Head round, dark red brown, epistoma whitish, sutures of clypeus and area about mouth black ; labium, except palpal rings and sutures, white ; ocelli reduced, the lower posterior one a pale spot without lens. Clypeus rounded a little above ; paraclypeal pieces strongly shield-shaped ; a slight dent at apex of clypeus and one at each side at base. Body robust, somewhat fleshy, incisures distinct, the annulations not strongly marked, the first annulet (tubercle i) the highest by a very little. Shields faintly brownish, the brown curved lines indicated. Tubercles small, normal ; setæ distinct, brown. Anal flap with a tubercle on each side of the middle. Spiracles pale brown, brown rimmed. Crochets 8 to 13 in a row, rather degenerate, though of good size, smaller posteriorly, those of joint 10 being especially weak and less in number. Outer part of the ellipse more reduced than the inner one. Epicranial lobes of head somewhat broadly touching."—(DYAR, MS.)

In popular parlance this species is known in England as the Hornet Moth, owing to its striking resemblance to the large yellow hornet (*Vespa crabro*). In Germany it is known as the Horniss-Schwärmer, Bienen-Schwärmer, Pappel-Schwärmer, or Wespenvogel. It is very sluggish in habit and may be readily captured. In Europe it is rather common, but in this country is rarely met with. In the larval stage the species lives in the lower parts of the trunks and main roots of poplar and willow and takes two years to come to maturity. The moth emerges during June and July.

Ægeria pacifica (Hy. Edw.).

PLATE XXIX, FIG. 10, FEMALE.

Trochilium pacificum HY. EDWARDS, Papilio, Vol. I, 1881, p. 180; GROTE, Check List N. Am. Moths, 1882, p. 11; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 171; *ibid.* Vol. VI, 1894, p. 365; *ibid.* Vol. VIII, 1896, p. 117; *ibid.* Vol. IX, 1897, p. 218; *ibid.* Vol. XII, 1899, p. 159.

Trochilium californicum NEUMOESEN, Ent. News, Vol. II, 1891, p. 108.

Male.—Head black, orbits and sides yellow; palpi yellow. Antennæ brown black, paler beneath. Legs yellow. Thorax deep brown, with a yellow line on each side on top, forming an angle in front and running obliquely downward. At the junction of the thorax and abdomen are some black hairs edged with yellow, and a small spot of the same color at the base of the fore wing. Abdomen with first and second segments black, the latter narrowly edged with yellow in front, remaining segments clear yellow, the third very narrowly edged with black posteriorly, and the fourth and fifth slightly suffused with testaceous. Underside wholly yellow. Wings transparent, narrowly bordered with orange brown; discal mark on fore wing and veins also orange brown.

Female.—Very similar to the male, but more robust, with the abdomen tapering.

Expanse: Male, 25–30 mm.; female, 35–40 mm.

Habitat.—Nevada, Montana, California, and Washington.

Types: Male and female. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Ægeria tibialis (Harris).

PLATE XXIX, FIG. 11 MALE, AND FIG. 12 FEMALE. PLATE XXXIII, FIG. 13, FEMALE, VARIETY.

Trochilium tibiale HARRIS, Am. Journ. Arts and Sciences, Vol. XXXVI, 1839, p. 306; MORRIS, Synop. N. Am. Lepid. 1862, p. 138; LINTNER, 23rd N. Y. State Cab. Rep. 1869 (1872), p. 60; PACKARD, Ins. Inj. For. and Sh. Trees, 1881, p. 123, Bull. No. 7, U. S. Ent. Com.; HY. EDWARDS, Papilio, Vol. II, 1882, p. 53; GROTE, New Check List N. Am. Moths, 1882, p. 11; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 366; *ibid.* Vol. VIII, 1896, p. 118; *ibid.* Vol. IX, 1897, p. 218; *ibid.* Vol. XII, 1899, p. 159.

Melittia? flavitibia WALKER, Cat. Lepid. Brit. Mus. Pt. VIII, 1856, p. 67.

Trochilium minimum NEUMOESEN, Ent. News, Vol. II, 1891, p. 108.

Male.—Head black, orbits and top lemon yellow, as are also the palpi. Antennæ jet black. Thorax deep brown black, with a very narrow yellow line on each side forming a yellow spot behind and meeting a rather broad curved line on each side in front. Sometimes the two lines on top are very indistinct or almost absent. The lateral line connects with the yellow spot on the base of the fore wings; sometimes the line is broken below the middle. Posterior edge of thorax with black hairs, broadly edged with yellow. Abdomen with first segment black, more or less narrowly edged with yellow behind, second segment wholly black, third segment yellow, narrowly edged with yellow behind, fourth segment wholly brown black, remaining segments brown black, with very narrow yellow bands behind, or yellow with very narrow brown black bands behind. Anal tuft brown black mixed with yellow. Underside of abdomen brown black with yellow bands. Legs yellow washed with brown. Fore wings transparent with the margins, veins, and discal mark orange brown or deep brown black. Hind wings with the borders very narrow, orange brown or brown black.

Female.—More robust than the male, with the markings of head, thorax, and wings similar, but as a rule a little more pronounced. Abdomen with the first, second, third, and fourth segments as in the male; last three sometimes almost entirely golden yellow, with the tip washed with brown; the fifth and sixth segments are half yellow and brown. Underside yellow, with narrow brown black bands, except the last or last two segments, which are wholly yellow.

Expanse: Male, 30-32 mm.; female, 35-40 mm.

Habitat.—Canada, New England States, New York, British Columbia, Vancouver, Colorado, and California.

Type: One female. Coll. T. W. Harris, Boston Soc. Nat. Hist.

Allied to *Æ. apiformis*, from which it may be readily distinguished by the lines on the thorax. The moths make their appearance in the field in July and August. In the larval stage it bores in the trunks of willow and poplar.

Bembecia Hübner.

FIG. 17.

Bembecia HÜBNER, Verz. bekant. Schmett. 1816, p. 128; HERRICH-SCHAEFFER, Syst. bearbeit. Schmett. Europa, 1845, p. 61.

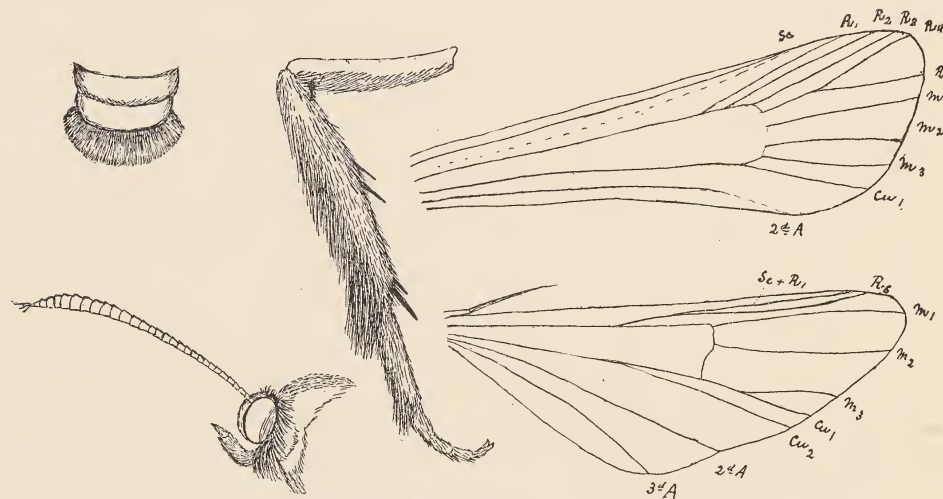


Fig. 17. Anal Tuft, Head, Hind Leg, and Venation of *Bembecia marginata*.

Palpi upturned, not reaching the top of the head, with rather long hairs at the base. Head small; thorax well rounded in front. Abdomen robust, with elevated hairs on the first and second segments. Anal tuft of male short, broad, and flat, that of the female very slight. Middle and hind femora and tibiae clothed with hairs. Antennae short, tapering, simple in the female and with long pectinations in the male. Tongue absent. Fore wings with 11 veins, R_4 and R_5 stalked; Cu_2 absent. Hind wings with outer margin strongly sinuate; veins M_3 and Cu_1 on a long stalk; vein Cu_2 running almost parallel. $Sc + R_1$ and R_5 stalked. Discocellulars erect.

Type: *Sesia hylæiformis* Laspeyres, Europe.

Bembecia marginata (Harris).

PLATE XXIX, FIG. 14, FEMALE.

Trochilium marginatum HARRIS, Am. Journ. Arts and Sciences, Vol. XXXVI, 1839, p. 309; MORRIS, Synop. Lepid. N. Am. 1862, p. 137; LINTNER, 23rd N. Y. State Cab. Rep. 1869 (1872), p. 60.

Sphecia? marginata WALKER, Cat. Lepid. Brit. Mus. Pt. VIII, 1856, p. 12.

Bembecia marginata HY. EDWARDS, note in Ins. Inj. For. and Sh. Trees (Packard, Bull. No. 7. U. S. Ent. Com. 1881, p. 261); Papilio, Vol. II, 1882, p. 52; GROTE, New Check List N. Am. Moths, 1881, p. 11; 11th Rep. Ent. Soc. Ont. 1888, p. 81, fig. 1; RILEY, Am. Nat. Vol. XVII,

- 1883, p. 792; SAUNDERS, Ins. Inj. Fruit, 1883, p. 303; *ibid.* 2nd Ed. 1889, p. 303; LINTNER, New England Homestead, 1886, p. 189; BEUTENMÜLLER, Ann. N. Y. Acad. Sc. Vol. V, 1890, p. 204; Bull. Am. Mus. Nat. Hist. Vol. V, 1893, p. 22; *ibid.* Vol. VIII, 1896, p. 118; *ibid.* Vol. IX, 1897, p. 218; SMITH, Cat. Ins. N. J. 1890, p. 288; Special Bull. N. J. Agric. Exp. St. N. J. 1891, p. 912; Rep. Ent. Agric. Exp. St. N. J. 1891, pp. 378-381, figs.; *ibid.* 1892 (1893), p. 459; Insect Life, Vol. IV, 1891, p. 29; KELLCOTT, Journ. Columbus Hort. Soc. Vol. V, 1890, p. 27; Can. Ent. Vol. XXIV, 1892, p. 44; JACK, Gard. and Forest, 1892, p. 426; WEBSTER, Science, Vol. XX, 1892, p. 338; Bull. 45, Ohio Agri. Exp. St. 1893, p. 159; Ent. News, 1893, p. 277; FLETCHER, Rep. Ent. Dept. Agric. Canada, 1895 (1896), p. 149; LUGGER, 4th Rep. Ent. Agric. Exp. St. Minn. 1898 (1899), pp. 54-55, figs.
- Aegeria plecïaformis* WALKER, Cat. Lepid. Brit. Mus. Pt. VIII, 1856, p. 40; HY. EDWARDS, Papilio, Vol. I, 1881, p. 206; BUTLER, Ann. Mag. Nat. Hist. XIV, 1874, p. 408.
- Sesia plecïaformis* BOISDUVAL, Suites à Buffon, Nat. Hist. Lep. Het. I, 1874, p. 436.
- Bembecia plecïaformis* GROTE, New Check List N. Am. Moths, 1881, p. 11; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. V, 1893, p. 23.
- Aegeria odyneripennis* WALKER, Cat. Lepid. Brit. Mus. Pt. VIII, 1856, p. 42; HY. EDWARDS, Papilio, Vol. I, 1881, p. 206.
- Sesia odyneripennis* BOISDUVAL, Suites à Buffon, Nat. Hist. Lep. Het. I, 1874, p. 437.
- Trochilium odyneripennis* MORRIS, Synop. Lepid. N. Am. 1862, p. 332.
- Albuna odyneripennis* GROTE, New Check List N. Am. Moths, 1881, p. 12.
- Aegeria rubi* RILEY, 6th Rep. Nox. Ins. Mo. 1874, p. 111; THOMAS, 1st Rep. Nox. Ins. Ill. 1876 (1878), p. 40; *ibid.* 2nd Rep. 1877 (1878), p. 175; PERKINS, 4th Rep. Vermont Bd. Agric. 1877, p. 146; MARTIN, Thomas's 5th Rep. Nox. Ins. Ill. 1880 (1881), p. 108; BRUNER, Rep. Neb. Hort. Soc. 1891, p. 195.
- Sesia flavipes* HULST, Bull. Brooklyn Ent. Soc. Vol. III, 1881, p. 76; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 171.

Male.—Head brown, orbits of eyes, palpi, and collar yellow. Antennæ black. Thorax deep brown black with yellow markings; two spots on each side in front, a short line at the base of the wing and a subcircular ring behind; sometimes this line is broken into spots. Abdomen deep brown black, with a golden yellow band on the posterior part of each segment, encircling the body. Anal tuft black, mixed with a little yellow. Third segment with raised black hairs mixed with a few yellow ones. Legs yellow, femora and tibiæ marked with black outside. Fore wings transparent with brown borders, paler internally; discal mark brown. Underside washed with yellow basally. Hind wings with very narrow border and fringes brown. All the veins are brown.

Female.—Similar to the male, but usually much heavier and larger, and it has the last segment entirely yellow. The bands are also more prominent.

Expanse: Male, 20-27 mm.; female, 20-35 mm.

Habitat.—Canada westward to the Gulf of Georgia, Vancouver, New England and Middle States, westward to Ohio, Illinois, Missouri, Kansas, and Nebraska.

Type: One female. Coll. T. W. Harris, Boston Soc. Nat. Hist.

Larva.—"Head with the lobes somewhat broadly touching, clypeus somewhat shield-shaped, the paraclypeal pieces parallel, even, and therefore sinuate, all level with the surface, concolorous and obscure; a low rounded lump at base of each paraclypeal piece; lower posterior ocellus distinct and like the others. Head (in the alcoholic material) entirely brown, uniform, smooth, labrum and epistoma colorless. Body normal, segments weakly 3-annulate, the second the highest, incisures well marked; joint 13 normal, the posterior half small; thoracic feet short, brown. Tubercles moderate, weak; setæ moderate; spiracles brown rimmed, only slightly elliptical. Crochets 12 to 15 in a row, remarkably reduced, resembling little setose spines rather than true hooks, small, remote. Body robust, not slender."—(DYAR, MS.)

***Bembecia marginata* var. *albicoma* Hulst.**

Bembecia marginata var. *albicoma* HULST, Bull. Brooklyn Ent. Soc. Vol. VI, 1883, p. 8; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. V, 1893, p. 23; *ibid.* Vol. VIII, 1896, p. 119.

Male.—Head, thorax, and abdomen deep sooty black with the markings very pale straw yellow instead of golden yellow as in the type form. The markings on the thorax are very indistinct and the first three segments are almost entirely black above, except for the very slight indication of a yellow ring on the first and third segments. Legs heavily washed with black. Margins of wings dark brown.

Expanse: 23–27 mm.

Habitat.—New York and New Jersey.

Type: One male. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

The moths make their appearance in the fields from about the early part of August to the middle of September. The eggs are laid singly on the canes of blackberry and raspberry, near the surface of the ground or a little below. The larvæ infest the crown of the roots and lower portions of the canes, which they burrow into or girdle more or less completely at its junction with the main root. The smaller larvæ run up the stems between the bark and wood. (Plate XXXV, Fig. 1.) Infested canes are usually dead and readily recognizable. During the latter part of June the larvæ seem to leave the old stalks and to attack the new shoots. At the seat of the injury there is an enlargement of the cane, and this gives room for the pupal cell. The head case of the pupa is provided with a triangular, sharp-pointed, chisel-like process, used in cutting a way through the bark. The larvæ overwinter in the canes and roots in various stages of growth.

***Vespamima* Beuten.**

FIG. 18.

Vespamima BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 87; *ibid.* Vol. VIII, 1896, p. 119.

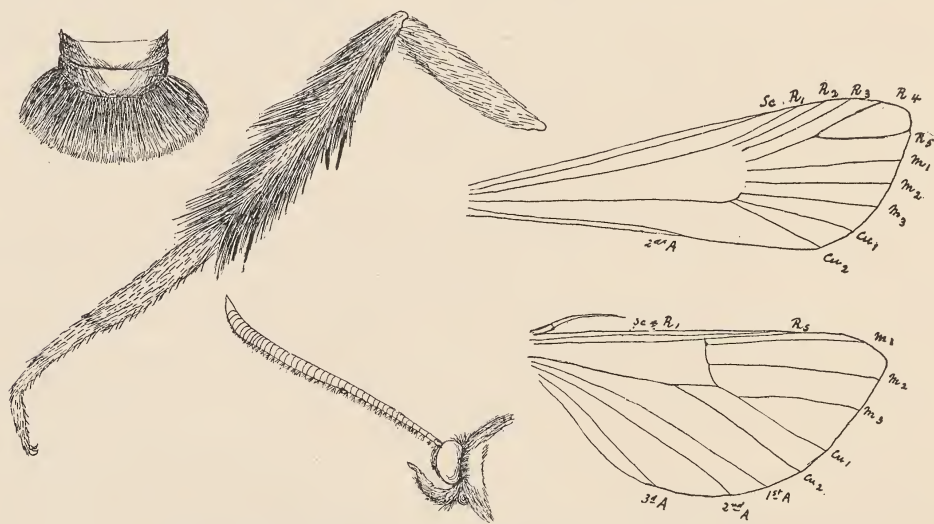


Fig. 18. Anal Tuft, Hind Leg, Head, and Venation of *Vespamima sequoie*.

Palpi slightly upturned, hairy, tip bare. Head rather small. Body robust, anal tuft of male broad and flat, that of the female very slight. Middle and hind tibiæ hairy. Tongue present. Antennæ long, slightly enlarged towards the tip, with fascicles of cilia in the male, simple in the female. Fore wings with 12 veins; R_4 and R_5 stalked. Hind wings with veins M_3 and Cu_1 on a short stalk. Discocellulars slightly oblique.

Type: *Bembecia sequoiæ* Hy. Edwards.

Vespamima sequoiæ (Hy. Edw.).

PLATE XXX, FIG. 23, MALE.

Bembecia sequoiæ HY. EDWARDS, Papilio, Vol. I, 1881, p. 181; Ins. Inj. For. and Sh. Trees, Bull. No. 7, U. S. Ent. Com. 1881, pp. 258, 261; GROTE, New Check List N. Am. Moths, 1882, p. 11; PACKARD, 5th Rep. U. S. Ent. Com. 1890, pp. 733 and 922.

Vespamima sequoiæ BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 87; *ibid.* Vol. VIII, 1896, p. 119; *ibid.* Vol. IX, 1897, p. 218.

Bembecia superba HY. EDWARDS, Papilio, Vol. I, 1881, p. 181; GROTE, New Check List N. Am. Moths, 1882, p. 11.

Ægeria pinorum BEHRENS, FRENCH, Can. Ent. Vol. XXI, 1889, p. 163; PACKARD, 5th Rep. U. S. Ent. Com. 1890, p. 371.

Male.—Head black, palpi yellow marked with black outside. Collar yellow. Antennæ black. Thorax black with a very narrow yellow line on each side, somewhat broader behind. Posterior end of thorax with a transverse yellow mark. Abdomen black with all the segments, except the first and third, bordered with rich lemon yellow above and below. Anal tuft black above, yellow beneath. Legs yellow and black; fore coxæ yellow; femora black outside, tibiæ yellow, and tarsi yellow banded with black. Fore wings transparent with very narrow black borders, and a transverse mark on each; on the base of the wings at the junction of thorax is a distinct yellow spot. Hind wings with margin very narrow, black, slightly yellow along the inner margin.

Female.—Similar to the male, but a little larger and more robust, the abdominal bands broader and better defined. Anal tuft straight.

Expanse: Male, 24–28 mm.; female, 26–30 mm.

Habitat.—California (Mendocino Co.) and Washington.

Types: Two males and two females. Hy. Edwards Coll., Am. Mus. Nat. Hist.

Larva.—"Head shaped normally (*S. exitiosa*), but the epicranial lobes not meeting, pointed towards each other, and approximate, the doubled black suture of the paraclypeal pieces running through to the vertical triangle. No upper clypeal impression. Brown, clypeus darker, a pale area above it and a stripe on each side of the paraclypeal pieces equalling them in width. Setæ distinct, ii and iv especially large, only i rudimentary; clypeal and paraclypeal setæ evident. Labrum brown, jaws black, epistoma pale brown. Body flat below, segments obscurely 3-annulate, the second highest. Tubercles large, colorless, setæ coarse and distinct; hair tubercles brown. Crochets of abdominal feet 7 to 11 in a row. Anal plate slightly corrugated, bearing a subdorsal tubercle, round and elevated."—(DYAR, MS.)

According to Hy. Edwards this species is devastating the pine forests in Mendocino County, California, and is particularly destructive to the big-tree (*Sequoia sempervirens*), *Pinus ponderosus*, and *Pinus lambertiana*. The eggs are laid in the axils of the branches, the young caterpillar boring in a tortuous manner about its retreat, thus diverting the flow of the sap, and causing large resinous nodules to form at the place of its workings. (Plate XXXIV, Figs. 1–3.) These nodules gradually harden, the branch then dies, and the tree at last suc-

cumbs to its insignificant enemies. Hundreds of fine trees in the forests of the region are to be seen in various stages of decay. The moths make their appearance in June and July, during which period the eggs are deposited. The larvæ begin to form their cocoons in December and January, being an evidence that the insect is double brooded. The larvæ when fully grown line the channel in the resinous nodules with silk, forming a sort of cocoon in which they transform to pupæ.

Parharmonia Beuten.

FIG. 19.

Harmonia HY. EDWARDS, Papilio, Vol. II, 1882, p. 54. (Preoccupied.)

Parharmonia BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 124.

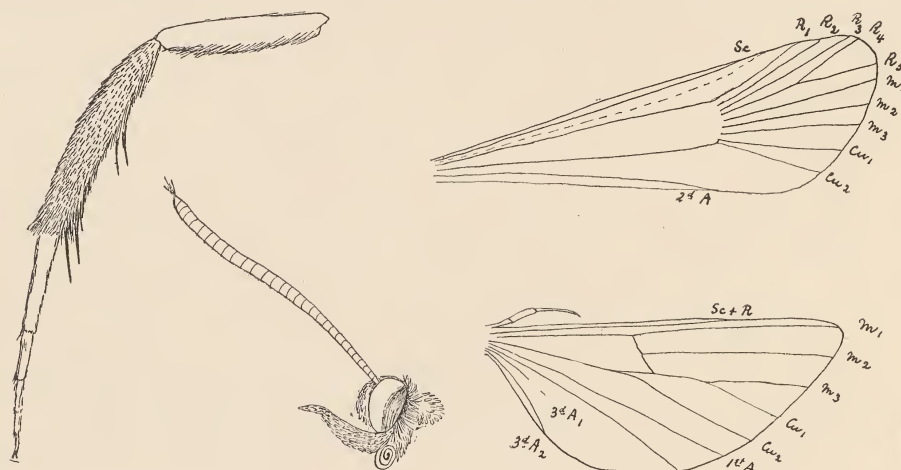


Fig. 19. Hind-leg, Head, and Venation of *Parharmonia pini*.

Palpi almost straight, with appressed scales. Antennæ long, filiform, very minutely ciliated in the male. Body slender, anal tuft of male straight, not prominent, that of the female, similar but less distinct. Hind tibiæ with short hairs. Fore wings with 12 veins; R_4 and R_5 stalked. Hind wings with veins M_3 and Cu_1 on a short stalk from the end of the cell. Vein 3A, indicated. Discocellulars oblique. Tongue present.

Type: *Ageria pini* Kellicott.

Parharmonia pini (Kellicott).

PLATE XXX, FIG. 13, MALE.

Ageria pini KELLICOTT, Can. Ent. Vol. XIII, 1881, p. 5; *ibid.* p. 157; PACKARD, Ins. Inj. For. and Sh. Trees, Bull. No. 7, U. S. Ent. Com. 1881, p. 180.

Harmonia pini HY. EDWARDS, Papilio, Vol. II, 1882, p. 54; GROTE, New Check List N. Am. Moths, 1882, p. 12; PACKARD, 5th Rep. U. S. Ent. Com. 1890, p. 727; COMSTOCK, Man. Stud. Ins. 1895, p. 261.

Parharmonia pini BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 124; *ibid.* Vol. IX, 1897, p. 219.

Male.—Head, palpi, antennæ, thorax, and legs wholly metallic blue or green black. Collar edged with orange in front. Abdomen blue black above, with the posterior half of the fourth segment orange; underside wholly orange. Anal tuft orange, blue black above in the middle. Fore

wings opaque, metallic blue or green black with discal mark somewhat deeper in color. Hind wings thinly covered with blue black scales; outer border very narrow, blue black.

Female.—Same as the male.

Expanse: Male and female, 28–30 mm.

Habitat.—Canada, New York, New Jersey, New Hampshire.

Types: Male and female. Coll. D. S. Kellicott.

Larva.—"Normal (*S. exitiosa*). Lower posterior ocellus not only pigmentless but without cornea. Head dark brown, uniform, labrum centrally, spot at base of antennæ and clypeal sutures black; sutures between paraclypeal pieces and lobes pale. Epicranial lobes meet only in a point. Second annulet highest; feet with short ellipses of crochets, 6 to 8 in a row. Length, 26 mm."—(DYAR, MS.)

The larvæ inhabit the pines and spruces, boring in a tortuous manner under the bark and into the superficial layers of wood. From the wounds thus made, pitch exudes, forming hemispherical masses over the burrows. (Plate XXXIV, Figs. 4 and 5.) In these masses, which are from three to four inches in diameter, the pupæ cells are finally formed. According to Kellicott, the larvæ occur more frequently than elsewhere just below a branch, or sometimes about the border of a wound made by the axe, or where a limb has been broken off by the wind. They are rarely met with in the axils of the branch. The insect appears to attack large trees and frequently at considerable altitude, sometimes from thirty to forty feet from the ground. Before transforming the larvæ prepare a cell lined with silk in the exuded pitch in which the pupal stages are passed. While in their burrows the larvæ move through the soft pitch with impunity, but if removed from it they soon die from the encumbrance of the hardening pitch adhering to them. They form their pupæ during the latter part of May and in June; the moths appear from about the middle of June to July or August.

Sanninoidea Beuten.

FIG. 20.

Sanninoidea BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 126; *ibid.* Vol. XII, 1899, p. 160

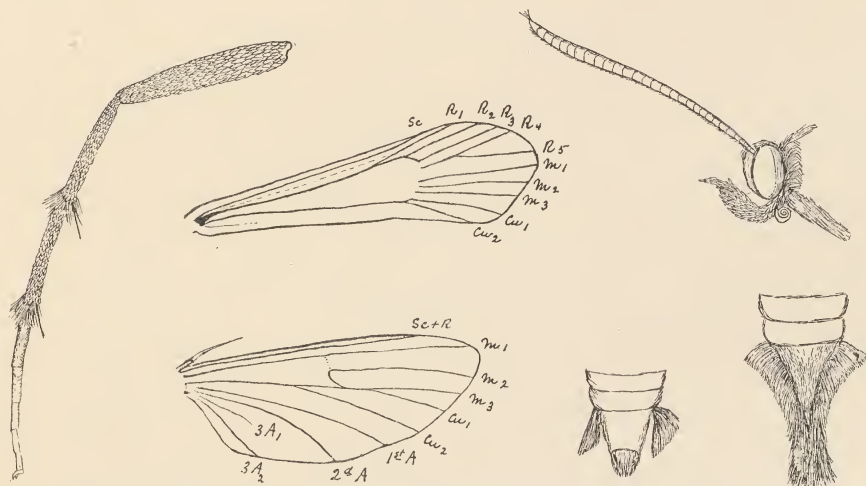


Fig. 20. Hind-leg, Venation, Head, Anal Tuft of female and male of *Sanninoidea exitiosa*.

Palpi upturned, scarcely reaching the top of the head, first and second joints loosely scaled, third joint very short with appressed scales. Antennæ filiform, long, with fascicles of cilia in the male. Abdomen slender in the male, anal tuft somewhat wedge-shaped; abdomen robust in the female with a short tuft of hairs on each side at the base of the last segment. Hind legs with appressed scales, tufted at the spurs. Fore wings with 12 veins; R_4 and R_5 stalked. Hind wings with veins M_3 and Cu_1 on a short stalk. $3A_1$ present. Discocellulars almost erect.

Type: *Egeria exitiosa* Say.

SYNOPSIS OF SPECIES AND VARIETIES.

MALES.

Wings transparent with black margins.

Abdomen black.

Fore wings with transverse mark and outer margin broad.....*pacifica*

Abdomen banded with yellow.

Fore wing with transverse mark and outer margin narrow.....*exitiosa*

Fore wing with transverse mark and outer margin broad.....*græfi*

FEMALES.

Fore wings opaque, green or blue black. Apex pointed.

Hind wings transparent, base and costa opaque.

Abdomen with fourth segment orange.....*exitiosa*

Hind wings with two transparent areas.

Abdomen with fourth segment orange.....var. *fitchii*

Hind wings with base and costa opaque or with two transparent areas.

Abdomen with fourth and fifth segments orange.....var. *edwardsii*

Hind wings not opaque, except outer margin.

Abdomen wholly black.....*pacifica*

Fore wings opaque with indications of transparent area. Apex rounded.

Hind wings transparent.

Abdomen wholly black.....*græfi*

Abdomen with fourth segment orange.....var. *barnesii*

Sanninoidea exitiosa (Say).

PLATE XXX, FIG. 16, MALE, AND FIG. 17, FEMALE.

KALM, Trav. in N. Am. Vol. II, 1794, p. 244; COOPER, Penn. Gaz. and Journ. 1771; Mem. Phil. Soc. Prom. Agricul. Vol. I, 1808, pp. 11-14; ELLIS, Mass. Agricul. Soc. 1801, p. 25; *ibid.* 1803; Trans. Am. Phil. Soc. Vol. V, 1803, p. 325; MEASE, Dom. Encycl. Vol. IV, 1803, p. 243; PETERS, Mem. Phila. Soc. Prom. Agricul. Vol. I, 1808, p. 15; MATLACK, Mem. Phila. Soc. Prom. Agricul. 1808, Vol. I, p. 273; COCKE, Mease Arch. Usef. Knowl. Vol. III, 1813, p. 40; Am. Farm. Vol. I, 1820, p. 350; Plough Boy, Vol. I, 1820, p. 331; THACHER, Am. Orchard. 1822, p. 198; AGRICOLA, Am. Farm. Vol. V, 1823, p. 118; SHOTWELL, Am. Farm. Vol. VI, 1824, p. 14; HAINES, Am. Farm. Vol. VI, 1824, p. 401; STABLER, Am. Farm. 1827, p. 29; "SENEX," Cultiv. Vol. II, 1835, p. 40; LANCASTER, Cultiv. Vol. VI, 1839, p. 133; ANON. Cultiv. Vol. VIII, 1841, p. 90.

Zygana persica BARTON, Phila. Med. & Phys. Journ. Vol. I, Pt. II, 1803, p. 29 (no description).

Egeria exitiosa SAY, Journ. Ac. Nat. Sci. Phila. Vol. III, 1823, p. 216; Am. Ent. Vol. II, 1825, pl. xix; WORTH, Journ. Ac. Nat. Sci. Phil. Vol. III, 1823, p. 217; Am. Farm. IV, 1823,

p. 395 ; Mem. Bd. Agri. N. Y. Vol. III, 1826, p. 421 ; HARRIS, Am. Journ. Art & Sc. Vol. XXXVI, 1839, p. 312 ; Ins. Inj. Veget. 1841, p. 232 ; *ibid.* 1852, p. 253 ; *ibid.* 1862, p. 331 ; Mass. Plough. Vol. I, June, 1842 ; *ibid.* 1843, p. 1 ; Proc. Am. Pom. Soc. 1854, p. 10 ; EMMONS, Nat. Hist. N. Y. Vol. V, 1854, p. 222, pl. xxvi, figs. 1-5 ; GLOVER, Rep. Com. Pat. 1854 (1855), p. 83, pl. vii ; FITCH, 1st Rep. Nox. Ins. N. Y. 1854, p. 41 ; LECONTE, Say, Am. Ent. 1859, p. 35, pl. xix ; MORRIS, Horticult. 1859, p. 508 ; RILEY, Prairie Farm. 1865, p. 122 ; *ibid.* 1868, p. 301 ; 1st Rep. Nox. Ins. Mo. 1869, p. 47 ; Colman's Rural World, 1876, pp. 153, 205 ; STODDARD, Encycl. Amer. 1883, p. 137 ; WALSH, Pract. Ent. Vol. I, 1866, p. 27 ; Prairie Farm. Vol. XLIII, 1872 ; WALSH & RILEY, Am. Ent. Vol. I, 1869, p. 168 ; PACKARD, Guide Study Ins. 1869, p. 277 and other ed. ; 5th Rep. U. S. Ent. Com. 1890, p. 521 ; SAUNDERS, Can. Ent. Vol. III, 1871, p. 22 ; *ibid.* Vol. IV, 1872, p. 133 ; Ins. Inj. Fruit, 1883, p. 191 ; *ibid.* 2nd ed. 1889, p. 19 ; REED, Rep. Ent. Soc. Ont. 1872, p. 44 ; COOK, Rep. Mich. Hort. Soc. 1874, p. 140 ; Inj. Ins. 1883, p. 126 ; THOMAS, 1st Rep. Nox. Ins. Ill. 1876 (1878), p. 88 ; *ibid.* 2nd Rep. 1877 (1878), p. 169 ; FRENCH, Thomas's 2nd Rep. Nox. Ins. Ill. 1876, p. 169 ; LINTNER, Count. Gent. Vol. XLIV, 1879, p. 199 ; *ibid.* Vol. LIII, 1888, p. 109 ; *ibid.* Vol. LIV, 1889, p. 661 ; *ibid.* Vol. LVI, 1891, p. 457 ; 2nd Rep. Nox. Ins. N. Y. 1879, pp. 6 and 216 ; Psyche, Vol. IV, 1883, p. 106 ; COMSTOCK, Rep. Com. Agricul. 1879 (1880), p. 254 ; FULLER, Am. Ent. Vol. III, 1880, p. 11 ; MARTIN, Thomas's 5th Rep. Nox. Ins. Ill. 1880 (1881), p. 107 ; KELLCOTT, Can. Ent. Vol. XIII, 1881, p. 7 ; RUTTER, Cult. and Diseases of Peach, 1880, p. 74 ; ZIMMERMANN, Gard. Month. 1881, p. 238 ; WILCOX, Peach Cult. 1886, p. 43 ; BARRY, Fruit Gard. 1888, p. 488 ; BRUNER, Rep. Neb. Hort. Soc. 1891, p. 195 ; JACK, Trans. Mass. Hort. Soc. 1894, p. 133 ; WEED, Ins. and Insectid. 1891, p. 77 ; *ibid.* 2nd Ed. 1895, p. 121 ; SCUDDER, Psyche, Vol. VI, pp. 58, 60, 122, 123-24.

Apis persica THOMAS, Am. Farm. 1824, p. 37 ; New Engl. Farm. Vol. III, 1824, p. 12.

Trochilium exitiosum FITCH, 3rd Rep. Nox. Ins. N. Y. 1856, p. 356.

Trochilium exitiosa MORRIS, Synop. Lepid. N. Am. 1862, p. 140.

Sannina exitiosa BUTLER, Ann. Mag. Nat. Hist. Vol. XIV, 1874, p. 408 ; GROTE, New Check List, Moths, 1882, p. 12 ; FERNALD, Stand. Nat. Hist. Vol. II, 1884, p. 463 ; WEED, Am. Nat. Vol. XXIII, 1889, p. 1108 ; ASHMEAD, Bull. No. 2, Agricul. Exp. St. Fla. 1888, p. 17 ; CROSSMAN, Bull. No. 3, Agricul. Exp. St. Ark. 1888 ; CORDLEY, Orch. and Gard. 1889, p. 211 ; SMITH, Cat. Ins. N. J. 1890, p. 289 ; 10th Rep. Agricul. Exp. St. N. J. 1889 (1890), p. 299 ; Ins. Life, Vol. IV, 1891, p. 43 ; Ent. News, Vol. VII, 1896, p. 107 ; Vol. VIII, 1897, p. 208 ; Econ. Ent. 1896, p. 261 ; TOWNSEND, Bull. No. 3, Agricul. Exp. St. N. Mex. 1891, p. 13 ; Ins. Life, Vol. V, 1892, p. 79 ; GILLETTE, Trans. Iowa Hort. Soc. 1890, 1891, p. 104 ; WEED, Bull. No. 4, Miss. Agricul. St. 1891, p. 17 ; South. Cult. Nov. 1894 ; ALWOOD, South. Plant. 1890, p. 565 ; BEUTENMÜLLER, Ann. N. Y. Acad. Sc. Vol. V, 1890, p. 204 ; KELLCOTT, Columb. Hort. Soc. Vol. V, 1890, p. 16 ; Can. Ent. Vol. XXIV, 1892, p. 44 ; WEBSTER, Ann. Rep. Columb. Hort. Soc. 1890 (1891), p. — ; Ins. Life, Vol. III, 1891, p. 298 ; LINTNER, 8th Rep. Inj. Ins. N. Y. 1893, p. 181 ; KELLOGG, Inj. Ins. Kans. 1892, p. 91 ; DAVIS, Proc. Mich. Hort. Soc. 1894 (1895), p. 68 ; Bull. 121, Agricul. Exp. St. Mich. 1895, p. 31 ; STIMSON, Bull. 33, Agri. Exp. St. Ark. 1895, p. 72 ; COMSTOCK, Man. Study Ins. 1895, p. 260 ; MCCARTHY, Rep. N. C. Agricul. Exp. St. 1895, p. 292 ; Bull. No. 78, Agricul. Exp. St. N. C. 1891, p. 27 ; *ibid.* 1893, p. 104 ; *ibid.* No. 120, 1895, p. 292 ; SLINGERLAND, Rural N. Y., 1896, p. 800 ; 1897, p. 805 ; 1898, p. 34 ; 1899, p. 222 ; Mich. Fruit. Grow. Vol. V, 1896, p. 8 ; Rep. Mich. Hort. Soc. 1896, p. 342 ; Proc. W. N. Y. Hort. Soc., 1898, p. 67 ; Trans. Mass. Hort. Soc. 1898 (1899), p. — ; MARLATT, Cir. 17, 2nd Ser. Dept. Agricul. Div. Ent. 1896 ; LOWE, 15th Rep. N. Y. Agri. Soc. 1896 (1897), p. 559 ; Proc. W. N. Y. Hort. Soc. 1897, p. 65 ; BUTZ, Bull. 37, Agricul. Exp. St. Pa. 1897, p. 23 ; STAMES, Bull. 42, Agricul. Exp. St. Ga. 1898, p. 226 ; STEDMAN, Bull. 44,

- Agricul. Exp. St. Mo. 1898, p. 12; FAVILLE & PARROT, Bull. 77, Agricul. Exp. St. Kan. 1898, p. 44; CRAIG, Bull. 1, 2nd Ser. Ottawa Exp. Farm. 1898, p. 44; BAKER, Bull. 90, Agricul. Exp. St. Alab. 1898, p. 27; FERNALD, Bull. 47, Agricul. Exp. St. Pa. 1899, p. 14; LUGGER, 4th Rep. Ent. Minn. 1899, p. 57.
- Paranthrene pepsidiformis* HÜBNER, Zutr. Exot. Schmett. 1825, p. 32, figs. 533-534; BEUTENMÜLLER, Journ. N. Y. Ent. Soc. Vol. VII, 1899, p. 255.
- Egeria persicæ* HARRIS, New England Farm. Vol. V, 1826, p. 33; Ent. Corr. Scudder, 1869, p. 359.
- Sesia xiphiæformis* BOISDUVAL, Suites à Buffon, Nat. Hist. Lepid. Het. I, 1874, p. 409; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 97.
- Egeria xiphiæformis* HY. EDWARDS, Ent. Am. Vol. III, 1888, p. 224.
- Sphinx exitiosa* BROWN, Book of Butt. Moths, and Sphinxes, 1832, p. 17, fig. 63.
- Sanninoidea exitiosa* BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 126; *ibid.* Vol. IX, 1897, p. 219; *ibid.* Vol. XII, 1899, p. 160; SMITH, Ent. News, Vol. VIII, 1897, p. 233; *ibid.* Vol. IX, pp. 79, 114-115, pl. vi; Bull. 128, Agricul. Exp. St. N. J. 1898; SLINGERLAND, Bull. 176, Cornell Univ. Agri. Exp. St. N. Y. 1899.

Male.—Head steel blue black, yellow in front between the eyes; palpi yellow beneath, black above; collar edged with yellow in front. Antennæ deep steel blue black. Thorax deep steel blue black with a narrow, pale yellow line on the patagia, and a transverse mark at the base. Thorax beneath with a pale yellow spot on each side. Abdomen steel blue black with a narrow pale yellow ring on the posterior edge of each segment; these rings are sometimes more or less distinct or almost absent. Anal tuft edged with white on each side. Legs steel blue black, tibiae with yellow tufts; tarsi yellow beneath; anterior coxæ also marked with yellow. Fore wings transparent, opalescent, borders narrow, violet or steel blue black slightly scaled with yellow; discal mark prominent. Underside marked with yellow. Hind wings transparent, outer border violet or steel blue black; costal border yellow, very narrow; underside same as above.

Female.—Very different from the male. Head, antennæ, palpi, thorax, and legs deep blue black. Abdomen blue black with the fourth segment orange above; sometimes the fifth segment is also scaled with orange. Fore wings opaque, entirely covered with deep blue or violet scales, with a satiny lustre. Hind wings transparent over about one half of their area, being heavily scaled with deep blue or violet at the base and along the costal margin; outer margin and fringes blue or violet.

Expanse: Male, 18-30 mm.; female, 23-32 mm.

Type: Lost.

Habitat.—Canada, Maine to Florida and Texas, westward to the Rocky Mountains.

Larva.—"Head rounded, full, somewhat flattened in front; clypeus high, the epicranial lobes meeting for a short distance about equal to the width of the paraclypeal pieces; a triangular membranous vertical piece; clypeus with the lower corners truncate, pointed above, an impression at each side at base and a smaller one below apex; paraclypeal pieces regular, rounded above, a little narrowed centrally, giving the outline of the clypeus a slight shield-shaped form; antennæ short, about half as long as the mandibles; ocelli four in a parallelogram, two behind the antenna, the lower one pigmentless but with a slight cornea; setæ obsolete except about the eyes; apex of head under joint 2. Light brown, shining, smooth, paler above the apex of clypeus, sutures between clypeus and paraclypeal pieces dark brown; a black patch with antennæ; jaws dark at tip; labrum pale. Body cylindrical, scarcely tapering anteriorly, more so posteriorly; segments rather short, 3-annulate; incisures distinct; subventral folds double, moderate. Cervical shield semicircular, indistinctly edged, strongly cut at the posterior lateral angles by a groove forming an arc; pale luteous, brown edged. Anal flap luteous, no distinct plate. Spiracles moderate, normal, except that of joint 12, which is twisted back of tubercle iii and directed posteriorly on the sloping surface of the body, larger than the others and more heavily brown ringed. Thoracic feet short; the abdominal ones on joints 7 to 10 nearly sessile, a transverse narrow ellipse of crochets in a single row, broken on the outside and inside at the ends of the ellipse; a small single row on joint 13. Tuber-

cles minute, brown; setæ short. On abdomen tubercle i dorsal to ii and not very remote, iv and v united, iv directly above v, vi on the lower subventral fold, vii of three hairs nearly in line on the anterior part of leg base. Skin white without marks, very minutely shagreened."—(DYAR, MS.)

Sanninoidea exitiosa var. fitchii (Hy. Edw.).

Ageria exitiosa var. *fitchii* HY. EDWARDS, Papilio, Vol. II, 1882, p. 55.

Sannina exitiosa var. *fitchii* GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1896, p. 172.

Sanninoidea exitiosa var. *fitchii* BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 126; *ibid.* Vol. XII, 1899, p. 160; SLINGERLAND, Bull. 176, Cornell Univ. Agri. Exp. St. 1899, p. 164.

Female.—Like the type form with the fourth abdominal segment orange and the space between the two inner veins of the hind wings nearly covered with blue black or violet scales, forming a stripe which divides the transparent disc into two parts.

Type: One female. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Sanninoidea exitiosa var. edwardsii Beuten.

PLATE XXX, FIG. 18, FEMALE.

Sanninoidea exitiosa var. *edwardsii* BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. XII, 1899, p. 160 (in text).

Female.—Like the type form, but the fourth and fifth segments are orange, and the hind wings have the space between the two inner veins more or less scaled with blue or violet black.

Type: One female. Coll. Am. Mus. Nat. Hist.

Sanninoidea exitiosa var. luminosa (Neum.).

Sannina exitiosa var. *luminosa* NEUMOEGEN, Ent. News, Vol. V, 1894, p. 331.

Sanninoidea exitiosa var. *luminosa* BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 126; *ibid.* Vol. XII, 1899, p. 160; SLINGERLAND, Bull. 176, Cornell Univ. Agri. Exp. St. 1899, p. 163.

Male.—Like the type form but with the borders of the wings heavily scaled with yellow, giving the insect a very characteristic appearance.

Type: One male, Coll. B. Neumoegen, Brooklyn Inst. Arts and Science.

This is the insect popularly known throughout the country as the Peach-tree Borer. The sexes are very unlike in appearance and color, so that they look like two distinct species. The male has transparent wings with narrow margins and very much resembles *Sesia pictipes*. The female has opaque, blue black fore wings, partly transparent hind wings, and the abdomen with the fourth and sometimes also the fifth segments orange. In general appearance it very much looks like the female of *Sannina uroceriformis*, and mimics certain wasps belonging to the genus *Pompilus*.

The species has been known to peach culturists for over one hundred and fifty years past. It received its scientific name in 1823, from Thomas Say, although it was referred to by Barton in 1803 as *Zygæna persicæ*, but this name is

untenable, not being accompanied by a description. In 1824 it was named *Apis persica* by Thomas, who supposed it to be a Hymenopterous insect. In 1825 Hübner described and figured the female as *Paranthrene pepsidiformis*, and in 1825 Harris called it *Ageria persica*, using Barton's name, but in subsequent papers on the species he adopted Say's name.

The time of flight of the moths in different States is somewhat variable and more definite data from many localities, especially in the South, are needed. Mr. Slingerland, in 1899, gives a very excellent compiled account, together with some original observations, on the time of appearance of the insect, which is here quoted in full: "The moths begin to appear early in May in the latitude of Washington, D. C., and southward, over what approximates the lower austral region; in the Gulf strip of this region they are recorded as appearing a month earlier. In the upper austral region, roughly comprising the States above the cotton belt and below the northern tier, the moths do not usually appear until after the middle of June; in the southern portions of some of the States in this region they are recorded as appearing in May. In the northern transition region, which comprises the northern tier of States, together with most of New York and New England, and also including Southern Canada, the moths appear chiefly in July and later, rarely emerging, however, as early as June 15th, and belated individuals as late as October or even November in Canada. June and July are the worst months for the moths over the principal peach districts south of the fortieth degree of latitude, while north of this the moths are the most numerous during July and August, and in Canada from August 15th to September 15th."

The eggs are deposited on the lower parts of the trunk, usually at the base of the tree. The egg is about .02 of an inch in length, and a little more than half as wide. It is light chestnut brown and subellipsoidal in form, slightly flattened, with an oval-shaped impression on one side. One end of the egg is somewhat obliquely truncate, with a slight depression in the middle where the micropyle is located. The egg hatches in about seven to eight days. The larva lives under the bark of the tree on the sap wood causing severe inflictions upon the tree (Plate XXXVI, Fig. 3). It continues to feed in this manner until the cold weather sets in, when it stops feeding and hibernates during the winter, either in the burrow or in a thin hibernaculum made over itself outside the bark in the exuded gum. The wound made by the larva causes the sap to flow, producing a large, soft gummy excrescence, which is well known to almost every one. As soon as the warm weather begins the larva again commences to feed until it is fully grown; at this period it spins an elongate, oval cocoon composed of grass and chips cemented together with a gummy substance. The cocoon is formed inside of the burrow or in contiguous places.

The larva usually confines its destructive work to the trunk or roots a short distance below the surface of the ground. Besides the peach, which is its most favorite food plant, the larva also feeds in the plum, almond, nectarine, apricot, wild and cultivated cherries, shad-bush (*Amelanchier canadensis*), and beach-plum.

The insect has a decided preference for the peach, as no other plant is so often and destructively attacked. The wild cherry is undoubtedly the native food-plant of the species.

Sanninoidea opalescens (*Hy. Edw.*).

PLATE XXX, FIG. 19, MALE, and FIG. 20, FEMALE.

Ægeria opalescens HY. EDWARDS, Papilio, Vol. I, 1881, p. 199; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 174.

Sannina opalescens BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 366.

Sanninoidea opalescens BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 126; *ibid.* Vol. IX, 1897, p. 219.

Sannina pacifica RILEY, Insect Life, Vol. III, 1891, p. 393; COMSTOCK, Man. Study Ins. 1895, p. 251; COOK, Rural Calif. 1895, p. 436; WOODWORTH, Rep. Agri. Exp. St. Calif. 1894-95 (1896) p. 231.

Male.—Head, thorax, and abdomen entirely black. Legs black with white tufts. Fore wings transparent with black margins. Transverse mark and outer margin very broad. Hind wings transparent with black border. Underside of wings same as above.

Female.—Head, thorax, abdomen, and legs wholly bronzy black. Fore wing opaque, bright metallic green black. Hind wings transparent, opalescent, outer margin and fringes blue or green black. Underside same as above.

Expanse: Male, 25-30 mm; female, 30-34 mm.

Habitat.—Nevada, California, Washington, Oregon.

Types: Two males. Coll. Hy. Edwards, Am. Mus. Nat. Hist. Male and female, *S. pacifica*, Coll. U. S. Nat. Mus.

Allied to *S. exitiosa*, but differs by having the transverse mark and outer margins of the fore wings of the male much broader. In the female the fore wings are opaque, the hind wings transparent and the abdomen wholly blue or green black. The moths appear during the latter part of May and in June. In the larval stage the species infests the lower parts of the trunk and roots of the peach, cherry, and apricot and is very destructive to these trees. The habits of this species are similar to those of *S. exitiosa*.

Sanninoidea græfi (*Hy. Edw.*).

PLATE XXX, FIG. 21, FEMALE, and PLATE XXXIII, FIG. 5, MALE.

Sciapteron græfi HY. EDWARDS, Papilio, Vol. I, 1881, p. 183; GROTE, New Check List N. Am. Moths, 1881, p. 11.

Parharmonia græfi BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 89; *ibid.* Vol. VIII, 1896, p. 125.

Male.—Head black, palpi yellow below, black above; collar edged with yellow in front. Antennæ blue black. Thorax blue black, with a very narrow yellow line on the patagia and one on the posterior part of thorax. Abdomen blue black, with a narrow, pale yellow ring on each segment, anal tuft edged with white. Legs blue black with yellow tufts. Fore wings transparent, opalescent, with narrow steel blue costal border and inner margins, the latter scaled with yellow;

outer margin considerably broader. Transverse discal mark distinct, blue black; underside with yellow scales. Hind wings transparent, with a narrow steel blue outer margin. Underside similar with costa scaled with yellow.

Female.—Head, palpi, antennæ, legs, and thorax wholly black, somewhat violaceous. Abdomen wholly black, or with the fourth segment scaled with orange (or entirely orange above). Underside black. Fore wings deep violet or green black, with traces of a heavier discal mark; underside similar. Hind wings transparent, with narrow violet margin and discal mark; sometimes slightly scaly in the cell. Underside similar to the above.

Expanse: Male, 22–28 mm.; female, 28 mm.

Habitat.—Colorado, Nevada, Washington.

Types: One female, Coll. Hy. Edwards, Am. Mus. Nat. Hist.; one female, Coll. E. L. Graef, Brooklyn Inst. Arts and Science.

Sanninoidea græfi var. *barnesii* var. nov.

PLATE XXXIII, FIG. 14, FEMALE.

Female.—Like the type form but with the fourth abdominal segment orange, giving it the aspect of the female of *S. exitiosa*.

Expanse: 28 mm.

Habitat.—Colorado.

Type: One female. Coll. Dr. W. Barnes, Decatur, Illinois.

Allied to *Sanninoidea exitiosa* and *S. opalescens*. What I regard as the male of *græfi*, differs in having the bands on the abdomen and markings very distinctly golden yellow. The female differs in having the apices of the fore wings more rounded than in either *exitiosa* or *opalescens*, and has a somewhat transparent area, with indications of a rather broad transverse mark. The abdomen is either wholly green or blue black or has the fourth segment wholly orange above or only partly so. In the larval stage the insect lives in the main roots of wild cherry. The moth emerges in July and August.

Albuna Hy. Edwards.

FIG. 21.

Albuna HY. EDWARDS, Papilio, Vol. I, 1881, p. 186.

Palpi ascending, reaching the top of the head, with short hairs. Antennæ filiform, finely ciliated in the male. Body slender, anal tuft of male flat and divided in the middle, thus forming two narrow, flat brushes. Fore wings 12 veined; R_4 and R_5 stalked. Hind tibiæ with short hairs. Hind wings with veins M_3 and Cu_1 from end of cell. Discocellulars slightly oblique.

Type: *Ægeria pyramidalis* Walker.

SYNOPSIS OF SPECIES AND VARIETIES.

Fore wings transparent, margins black, slightly marked with red.

Abdomen with pale yellow bands.

Legs black with yellow bands.....*pyramidalis*

Legs yellow with black bandsvar. *montana*

Fore wings very heavily marked with red.

Abdomen with bright yellow bands.

Legs orange-yellow var. *rubescens*

Fore wings black, without red.

Abdomen and legs wholly black var. *coloradensis*

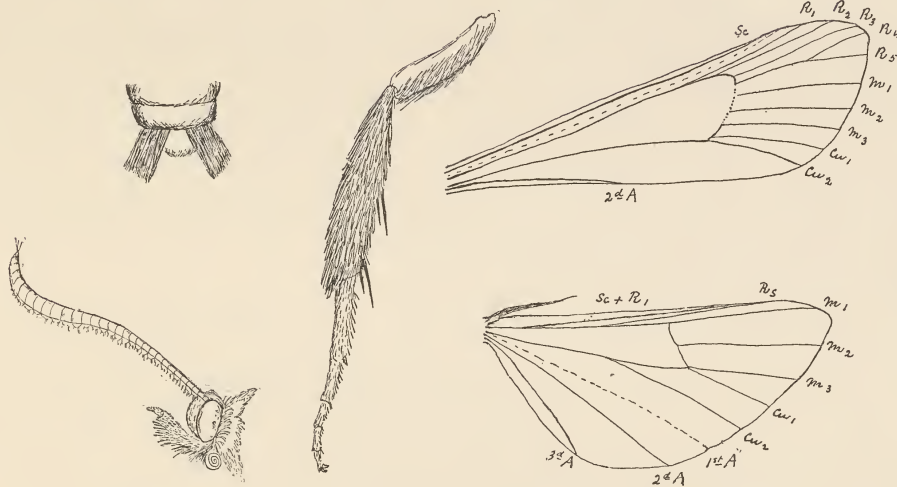


Fig. 21. Anal Tuft of Male, Head, Hind Leg, and Venation of *Albuna pyramidalis*.

Albuna pyramidalis (Walker).

Ægeria pyramidalis WALKER, Cat. Lep. Brit. Mus. Pt. VIII, 1856, p. 40; HY. EDWARDS, Papilio, Vol. I, 1881, p. 206.

Trochilium pyramidalis MORRIS, Synop. Lepid. M. Am. 1862, p. 331.

Sesia pyramidalis BOISDUVAL, Suites à Buffon, Nat. Hist. Lepid. Het. I, 1874, p. 435.

Albuna pyramidalis GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 89; *ibid.* Vol. VIII, 1896, p. 127.

Ægeria hylotomiformis WALKER, Cat. Lepid. Brit. Mus. Pt. VIII, 1856, p. 43; HY. EDWARDS, Papilio, Vol. I, 1881, p. 207.

Sesia hylotomiformis BOISDUVAL, Suites à Buffon, Nat. Hist. Lepid. Het. I, 1874, p. 438.

Albuna hylotomiformis HY. EDWARDS, Papilio, Vol. I, 1881, p. 186; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. V, 1893, p. 23.

Albuna vancouverensis HY. EDWARDS, Papilio, Vol. I, 1881, p. 188; GROTE, Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 172.

Male.—Head black, orbits pale yellow; palpi yellow, black outside. Thorax black, with the patagia slightly lined with yellow towards the tip; at the posterior end of the thorax is a transverse yellow line and a small spot of the same color at the base of the fore wings. Collar edged with yellow. Antennæ black, ferruginous beneath. Abdomen black, with a pale yellow band on each segment. Anal tuft black. Legs black, tibiae banded with yellow. Fore wings transparent, with broad black borders, discal mark bordered with red on each side; outer border edged within with red and inner margin to the anal angle also red. Underside with the borders and discal mark suffused with red and orange. Hind wings transparent, with discal mark and margin brown black; underside same as above.

Female.—Same as the male, but more robust.

Expanse: Male, 18–25 mm.; female, 18–30 mm.

Habitat.—Nova Scotia, Canada, Maine to Massachusetts, Northern New York and westward to the Pacific.

Albuna pyramidalis var. *montana* (Hy. Edw.).

PLATE XXXII, FIG. 34, MALE.

Albuna montana HY. EDWARDS, Papilio, Vol. I, 1881, p. 188; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 172; GILLETTE, Bull. 43, Agricul. Coll. Colorado, 1898, p. 6.

Albuna pyramidalis var. *montana* BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 90; *ibid.* Vol. VIII, 1896, p. 127.

Albuna tanaceti HY. EDWARDS, Papilio, Vol. I, 1881, p. 188; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 171.

Similar to the type form, but the legs are yellow, with a narrow black band on the tibiæ; the red on the fore wings is more pronounced and the veins of the hind wings are usually marked with red. The bands on the abdomen are also more prominent.

Habitat.—Same as that of *A. pyramidalis*.

Types: Three females; *A. tanaceti*, four females. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Albuna pyramidalis var. *rubescens* (Hulst).

PLATE XXXIII, FIG. 19, FEMALE.

Sesia rubescens HULST, Bull. Brooklyn Ent. Soc. Vol. III, 1881, p. 76.

Albuna rubescens GROTE, New Check List N. Am. Moths, 1882, p. 12 (as synonym of *odyneripennis*); BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 171.

Albuna pyramidalis var. *rubescens* BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 90; *ibid.* VIII, 1896, p. 127.

Female.—Head black between the antennæ, face, collar and palpi golden yellow, as are also the stripes and transverse mark on the thorax. Abdomen black, with the second, fourth, fifth, and sixth segments broadly banded with golden yellow above and below; third segment with a small yellow spot on top and banded with golden yellow beneath. Anal tuft golden yellow, black on each side at the base. Legs golden yellow, femora marked with black. Fore wings with the brown black borders heavily edged with red within. Discal mark heavily marked with red on each side; underside the red much more prominent than above; discal mark wholly red. Hind wings with the veins red, and outer border edged within with red; underside with the red more conspicuous.

Habitat.—Colorado.

Type: One female. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Albuna pyramidalis var. *coloradensis* (Hy. Edw.).

PLATE XXXIII, FIG. 12, FEMALE.

Albuna coloradensis HY. EDWARDS, Papilio, Vol. I, 1881, p. 189; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 172.

Albuna pyramidalis var. *coloradensis* BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 90; *ibid.* Vol. VIII, 1896, p. 127.

Albuna torva HY. EDWARDS, Papilio, Vol. I, 1881, p. 189; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 172.

Male and Female.—Wholly deep black, without any traces of yellow on the body and legs; sometimes there is a very slight trace of red on the inner margin of the fore wings.

Habitat.—Same as that of the type form.

Types: One female; *A. torva*, one female; *A. vancouverensis*, male and female. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Nothing is known regarding the earlier stages of this species. It is subject to considerable variation; the fore wings being more or less marked with red. In the type form the legs are black, with yellow bands. The variety *montana* has yellow legs with black bands and the fore wings more red than *pyramidalis*. The variety *rubescens* has the fore wings very heavily marked with red; the bands on the abdomen and the legs are rich golden yellow. The variety *coloradensis* is entirely black without any markings whatever. The moths make their appearance from June until about the middle of August.

Albuna fraxini (Hy. Edw.).

PLATE XXX, FIG. 12, MALE.

Carmenta fraxini HY. EDWARDS, Papilio, Vol. I, 1881, p. 185; GROTE, New Check List N. Am. Moths, 1882, p. 12; PACKARD, 5th Rep. U. S. Ent. Com. 1890, p. 542.

Harmonia morrisonii HY. EDWARDS, Papilio, Vol. II, 1882, p. 54; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 171.

Parharmonia fraxini BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 89; *ibid.* Vol. VIII, 1896, p. 124.

Male.—Head black. Antennæ black with a long yellowish white patch before the tip, underside wholly yellow; palpi yellow at base, black towards the tip. Thorax bronzy purplish black, with a tuft of sordid white hairs each side at the base. Abdomen wholly bronzy black, as is also the divided anal tuft. Legs black, tarsi dirty yellow; anterior coxæ at base yellow. Fore wings opaque purplish black, bronze outwardly; discal mark red. Underside washed with yellow basally. Hind wings transparent, discal mark and outer border purplish black.

Female.—Same as the male; anal tuft straight, slight.

Expanse: Male and female, 20–25 mm.

Types: One male; *H. morrisonii*, one female. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Sesia Fabricius.

FIG. 22.

Sesia FABRICIUS, Syst. Ent. 1775, p. 549 (in part); HÜBNER, Tentamen, 1806 (?) p. 1 (restrict. sense).

Egeria FABRICIUS, Syst. Glossat. 1807; ILLIGER, Mag. Insect. Vol. VI, 1807, p. 288 (in part).

Bembecia HÜBNER, Verz. bekant. Schmett. 1816, p. 128 (in part).

Synanthedon HÜBNER, l. c. p. 129.

Conopia HÜBNER, l. c. p. 129.

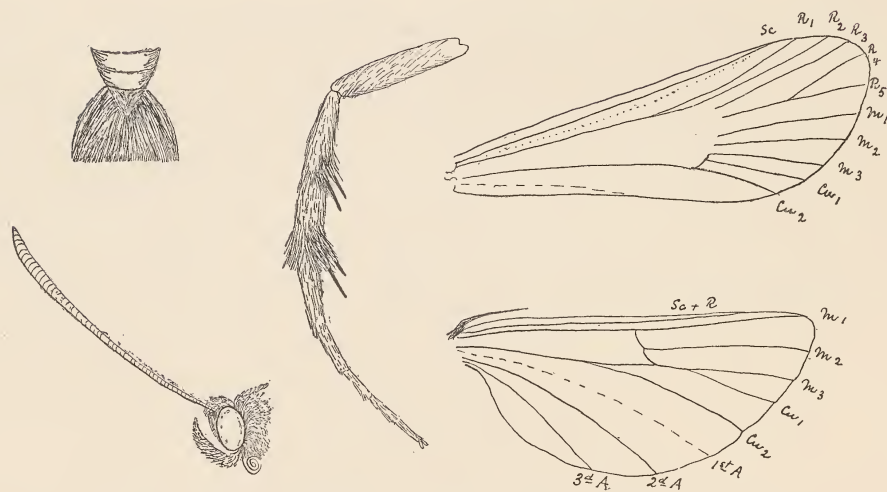
Setia MEIGEN, Syst. Beschreib. Europ. Schmett. 1830, p. 119.

Pyrrhotania GROTE, Can. Ent. Vol. VII, 1875, p. 174.

Carmenta HY. EDWARDS, Papilio, Vol. I, 1881, p. 184.

Palpi ascending, reaching the top of the head, with appressed or loose scales or hairs, third joint small, conical. Antennæ slightly thickened towards the tip, simple in the female, ciliated or simple in the male. Abdomen slender, anal tuft large, fan-like in the male, brush-like in the female. Legs with tufts at joints, or with short loose hairs. Fore wings with veins R_4 and R_5 stalked. Hind wings with veins M_3 and Cu_1 stalked. Sc + R. Discocellulars oblique.

Type: *Sphinx tipuliformis* Clerck.

Fig. 22. Anal Tuft of Male, Head, Hind Leg, and Venation of *Sesia tipuliformis*.

SYNOPSIS OF SPECIES.

Sexes Similar.

- Large species. Fore wings more or less transparent or opaque; hind wings transparent.
- Abdomen with fourth and fifth segments red.
- Fore wings with outer margin black.....*rubrofascia*
- Fore wings with outer margin orange red.....*bolteri*
- Abdomen with fourth segment red.
- Fore wings at base above and beneath golden yellow....*culiciformis*
- Fore wings not golden at base, beneath blue.....*americana*
- Abdomen with fourth segment orange and last two segments banded with orange.
- Fore wings heavily marked with orange.....*præstans*
- Abdomen black, first three segments orange beneath. Legs orange.
- Fore wings with very narrow black margins.....*fulvipes*
- Abdomen with first and second segments above orange.
- Fore wings with blue margins.....*tepperi*
- Abdomen wholly black.
- Fore wings with black margins.
- Legs orange.....*saxifragæ*
- Legs black, with white tufts.....*albicornis*
- Abdomen bluish, with two very narrow yellow bands.
- Fore wings with very narrow margins.....*pictipes*
- Abdomen of male with two (rarely three) and female with four yellow bands.
- Fore wings with margin black, sometimes rayed with golden, male.....*rutilans*
- Fore wings rayed with golden, female.....*rutilans*
- Fore wings filled with orange, female.....*refulgens*
- Abdomen with two white bands, male.
- Fore wings with black margins.....*alaskæ*
- Abdomen of male with four, female with three distinct yellow bands.
- Fore wings with outer margin rayed with golden yellow.....*tipuliformis*
- Fore wings heavily marked with orange red.....*tacoma*
- Fore wings with narrow black margins.....*gilia*
- Abdomen of male with four, female with three orange bands.

- Fore wings rayed with orange.
 Thoracic markings very prominent.....*marica*
 Thoracic markings slight; small species.....*seminole*
 Fore wings almost opaque, brownish.....*texana*
 Abdomen of male with four, female with three very narrow yellow bands.
 Fore wings with margins black.
 Anal tuft bright red.....*corni*
 Abdomen with three yellow bands in both sexes.
 Fore wings with black margins and orange transverse mark.....*sigmoidea*
 Abdomen of male with five, female with four very broad golden yellow bands.
 Fore wings with margins red, golden yellow, or golden bronze.....*mellinipennis*
 Abdomen of male with six, female with five yellow bands.
 Fore wings with margins and discal mark bronze.....*lustrans*
 Fore wings with margins very narrow, black, male, or very broad, ferruginous, female.
 Discal mark red.....*rileyana*
 Like *rileyana* but very much paler.....var. *mimuli*
 Fore wings marked with orange, female.....*arizonæ*
 Abdomen brown, with five narrow white bands, female.
 Fore wings black, filled with white.....*morula*
 Abdomen with all the segments banded with orange.
 Very large species: wings with narrow black borders.....*novaroensis*
 Abdomen not banded, scaled with yellow.
 Fore wings rayed with yellow; discal mark black.
 Anal tuft orange red.....*acerni*
 Small species. Wings more or less transparent.
 Abdomen with one narrow and one very broad yellow band.
 Fore wings with black margins.....*scitula*
 Abdomen with two narrow yellow bands.
 Fore wings with black margins.....*pyri*
 Fore wings almost opaque, golden yellow, female.....*neglecta*
 Abdomen with two white bands.
 Fore wings with margins black; rayed with white.
 Fringes of hind wings white.....*prosopis*
 Abdomen of male and female with three yellow bands.
 Fore wings with narrow violet black margins.
 Discal mark red.....*rubristigma*
 Abdomen of male with four, female with three yellow bands.
 Fore wings with margins broad, filled with yellow.
 Discal mark orange.....*dicipiens*
 Fore wings with margins narrow, bronze.
 Discal mark bronze.....*corusca*
 Abdomen with four bands and fourth segment yellow.
 Fore wings with narrow black margins.....*querci*
 Abdomen with five yellow bands.
 Fore wings with narrow black margins.....*tecta*
 Abdomen wholly black.
 Fore wings not marked with white.
 Fringes of hind wings black.....*ithacæ*
 Fore wings opaque; hind wings transparent.
 Abdomen with fourth segment yellow.
 Fore wings violaceous.....*pyralidiformis*

- Abdomen with two white bands.
 Fore wings black with a small white spot.....*sanborni*
 Abdomen with three yellow bands.
 Fore wings violaceous, marked with red*minuta*
 Abdomen with four yellow bands.
 Fore wings violaceous.....*aurecopurpurea*
 Abdomen red.
 Fore wings blue*geliformis*
 Abdomen with last three segments red.
 Fore wings streaked with red.....*sapygæformis*
 Abdomen with three red bands.
 Fore wings streaked with red.....*floridensis*

Sexes Dissimilar.

MALES.

- Fore wings with transparent spaces ; margins green.
 Hind wings transparent.
 Abdomen green, with fourth and last segments red.....*fragariæ*
 Fore wings opaque, blue ; inner margin red.
 Hind wings transparent.
 Abdomen with fourth and last two segments red.....*polygoni*
 Abdomen blue.....*achillæ*
 Abdomen with last two segments red.....*animosa*
 Abdomen with last four segments red.....*behrensi*
 Fore wings brown, dotted with yellow.
 Hind wings opaque, brown.
 Abdomen with traces of yellow bands.....*subærea*
 Fore wings black, marked with a little white.
 Hind wings black.
 Abdomen with three white bands.....*nigra*

FEMALES.

- Fore wings opaque, metallic green or blue, red along inner margin.
 Hind wings scarlet, partly transparent.
 Abdomen with fourth and last segments red.....*fragariæ*
 Hind wings wholly scarlet, border black.
 Abdomen with last three segments scarlet.....*behrensi*
 Abdomen with fourth and last segments scarlet.....*polygoni*
 Hind wings opaque, green black.
 Abdomen green black, red along the sides posteriorly.....*animosa*
 Hind wings black, partly transparent basally.
 Abdomen wholly green black.....*mariona*, sp. nov.
 Fore wings brown, rayed with white.
 Hind wings brown.
 Abdomen with two yellowish bands.....*verecunda*
 Fore wings brown.
 Hind wings orange.
 Abdomen with two bands and fourth segment yellow.....*edwardsii*

Sesia mellinipennis Boisduval.

PLATE XXXI, FIGS. 2, MALE, 26 AND 27, FEMALES; PLATE XXXIII, FIG. 22, FEMALE.

Sesia mellinipennis BOISDUVAL, Species Gen. Lepid. (Suites à Buffon), Vol. II, 1836, pl. xiv, fig. 12; Suites à Buffon, Nat. Hist. Lepid. Het. I, 1874, p. 402; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 96; *ibid.* Vol. VIII, 1896, p. 129.

Egeria mellinipennis HY. EDWARDS, Ent. Am. Vol. III, 1888, p. 224.

Albuna resplendens HY. EDWARDS, Papilio, Vol. I, 1881, p. 186; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 172.

Albuna artemisiæ HY. EDWARDS, Papilio, Vol. I, 1881, p. 187; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 172.

Egeria senecioides HY. EDWARDS, Papilio, Vol. I, 1881, p. 198; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 174.

Male.—Head black, palpi golden yellow; collar golden yellow in front. Antennæ deep black, slightly ferruginous beneath. Thorax deep black, with a golden yellow line on each side and a transverse mark of the same color posteriorly. Underside of thorax golden yellow. Abdomen black, second and last four segments with a broad golden band. Anal tuft black, yellow beneath. Legs golden yellow, with a black band on the tibiæ. Fore wings transparent, borders, discal mark and veins brown black, with the opaque portion between the veins more or less coppery red. Basal transparent area elongate triangular, outer area small, rounded; underside with the red parts predominating and brighter than above. Hind wings transparent, outer border narrow, brown with a rather broad coppery red line, underside like the upper, but the costa is coppery red.

Female.—Like the male, but the fore wings are usually more opaque and redder, or are yellow between the veins. The last three segments are broadly banded with yellow, instead of the last four as in the male. Anal tuft golden yellow, with a little black on top in the middle.

Expanse: Male, 22–25 mm.; female, 25–27 mm.

Habitat.—Sierra Nevada, California, Durango, Colorado.

Type: Lost. *Albuna resplendens*, one male; *A. artemisiæ*, one male; *Egeria senecioides*, one male. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Nothing is known about the earlier stages of this species. It is somewhat variable in the coloration of the fore wings. These vary from golden yellow to orange red or golden bronze.

Sesia giliæ (Hy. Edw.).

PLATE XXXI, FIG. 8, MALE; PLATE XXXIII, FIG. 1, FEMALE.

Egeria giliæ HY. EDWARDS, Papilio, Vol. I, 1881, p. 200; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 174.

Sesia giliæ SMITH, List Lepid. Am. 1891, p. 21; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896.

Albuna vitrina NEUMOEGER, Ent. News, Vol. II, 1891, p. 109.

Sesia deceptiva BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 93.

Male.—Head black, face pale yellow; palpi yellow, with black hairs outside. Collar edged with yellow in front. Antennæ black. Thorax black, with a few yellow hairs at the tips of the patagia. Abdomen black, with a yellow band on the second, fourth, and last two segments; underside with the bands repeated or almost entirely yellow. Anal tuft yellow, black above. Legs yel-

low, with a black band on the tibiæ. Fore wings transparent, with narrow black borders; discal mark prominent, sometimes marked with a little red outside. Underside with border and discal mark yellow. Hind wings transparent, with narrow black outer margin.

Female.—Head black, face and palpi yellow. Wings with brown borders and discal mark on fore wings rather heavily marked with orange outside and wholly orange beneath. Abdomen with three yellow bands, one on each of the second, fourth, and sixth segments; underside with trace of a band on the fifth segment. Anal tuft yellow mixed with black. Otherwise like the male.

Expanse: Male, 20–22 mm.; female, 24–25 mm.

Habitat.—Colorado, Montana, British Columbia, Huachuca Mts., Arizona.

Types: *Ægeria gilia*, one female; *S. deceptiva*, two males Coll. Am. Mus. Nat. Hist.; *Albuna vitrina*, one male. Coll. B. Neumoegen, Brooklyn Inst. Arts and Sciences.

An easily recognizable species. The margins of the fore wings are rather narrow, black, and the abdomen has four yellow bands in the male and three in the female. Nothing is known regarding its life-history.

Sesia rileyana (Hy. Edw.).

PLATE XXXI, FIG. 9, MALE, AND PLATE XXXII, FIG. 25, FEMALE.

Albuna rileyana HY. EDWARDS, Papilio, Vol. I, 1881, p. 187; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 172.

Sesia rileyana BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 129.

Ægeria brunneipennis HY. EDWARDS, Papilio, Vol. I, 1881, p. 191; GROTE, New Check List N. Am. Moths, 1882, p. 12.

Sesia brunneipennis SMITH, List N. Am. Lepid. 1891, p. 20; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 129.

Ægeria hyperici HY. EDWARDS, Papilio, Vol. I, 1881, p. 195; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. 1892, p. 173.

Male.—Head black, face yellow; palpi yellow, with black hairs outside. Collar edged with yellow in front and behind. Thorax black, patagia edged with yellow posteriorly, base with a transverse yellow mark and a small spot of the same color at the base of the fore wings. Antennæ black, rather strongly pectinated. Abdomen black with six lemon yellow bands, basal segment with no band or only a very slight trace of one. Anal tuft black mixed with yellow. Legs yellow banded with black. Fore wings transparent, with narrow brown borders; discal mark bright red; underside similar to the above, but the costa is washed with yellow. Hind wings transparent, with a narrow brown margin; discal mark very slight, red. Underside same as above.

Female.—Somewhat like the male, but has only five bands. Anal tuft black. Fore wings with costal margin somewhat broader and the outer margin very broad, reducing the outer transparent area to a small rounded space; the margins are bronzy brown, the inner one red to nearly the anal angle. Discal mark prominent, red, narrowly edged within with brown. Underside with costal and inner margins washed with yellow, outer part rayed with red between the veins. Hind wings with margin somewhat broader than in the male. Underside more or less lined with red.

Expanse: Male, 20–23 mm.; female, 23–30 mm.

Habitat.—North Carolina, West Virginia, Illinois, Ohio, Kansas, Missouri, Montana, California, Oregon.

Types: One female; *Æ. hyperici*, two males. Coll. Hy. Edwards, Am. Mus. Nat. Hist.; *Æ. brunneipennis*, one female. Coll. F. Tepper, Agricul. College, Michigan.

The male and female differ somewhat; the former has the margins of the

wings quite narrow, and the latter has the margins very broad. Earlier stages unknown.

Sesia mimuli (Hy. Edw.).

Ægeria mimuli HY. EDWARDS, Papilio, Vol. I, 1881, p. 200; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 174.

Sesia mimuli SMITH, List Lepid. N. Am. 1891, p. 21; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 130.

Male.—Head black, face white; palpi sordid white, mixed with a few brown hairs outside. Antennæ black. Thorax black, tips of patagia and transverse posterior mark pale dirty yellow. Abdomen black, with six pale, faded yellow bands. Anal tuft black, mixed with faded yellow. Femora black, tibiæ and tarsi faded yellow, the former marked with black and white. Fore wings transparent, border of a faded brown color; discal mark red. Underside pale yellowish, discal mark also yellowish. Hind wings with margin of a faded brown color. Underside with a pale yellowish white line in the margin.

Expanse: 21 mm.

Habitat.—Colorado.

Type: One male. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Very closely allied to, if not identical with *S. rileyana*, from which it differs only in the paler color of the marking on the wings and abdomen. It is without much doubt a climatic variety of *S. rileyana*. Only the type specimen is known to exist in collections.

Sesia rutilans (Hy. Edw.).

PLATE XXXII, FIG. 22, MALE, AND FIG. 23, FEMALE.

Albuna rutilans HY. EDWARDS, Papilio, Vol. I, 1881, p. 186; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 172.

Ægeria rutilans BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 94.

Sesia rutilans BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 130; *ibid.* Vol. IX, 1897, p. 219.

Ægeria aureola HY. EDWARDS, Papilio, Vol. I, 1881, p. 184; GROTE, New Check List N. Am. Moths, 1882, p. 12.

Sesia aureola SMITH, List Lepid. N. Am. 1891, p. 20.

Ægeria hemizonæ HY. EDWARDS, Papilio, Vol. I, 1881, p. 198; GROTE, New Check List N. Am. Moths, 1882, p. 12; RIVERS, Papilio, Vol. III, 1883, p. 26; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 174.

Sesia hemizonæ SMITH, List Lepid. N. Am. 1891, p. 20; LUGGER, 4th Rep. Ent. Agricul. Exp. St. Minn. 1898 (1899) p. 64.

Ægeria lupini HY. EDWARDS, Papilio, Vol. I, 1881, p. 192; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 173; *ibid.* Vol. V, 1893, p. 24; *ibid.* Vol. VI, 1894, p. 91.

Sesia lupini SMITH, List Lepid. N. Am. 1891, p. 20.

Ægeria perplexa HY. EDWARDS, Papilio, Vol. I, 1881, p. 192; GROTE, New Check List N. Am. Moths, 1882, p. 12.

Sesia perplexa SMITH, List Lepid. N. Am. 1891, p. 20.

Ageria impropria HY. EDWARDS, Papilio, Vol. I, 1881, p. 193; GROTE, New Check List N. Am. Moths, 1882, p. 12; RILEY, Proc. Ent. Soc. Wash. Vol. I, 1888, p. 85; RIVERS, Ent. Amer. Vol. IV, 1888, p. 99; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 173.

Sesia impropria SMITH, List Lepid. N. Am. 1891, p. 20.

Ageria washingtonia HY. EDWARDS, Papilio, Vol. I, 1881, p. 197; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 173.

Sesia washingtonia SMITH, List Lepid. N. Am. 1891, p. 20.

Ageria madariæ HY. EDWARDS, Papilio, Vol. I, 1881, p. 201; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 174.

Sesia madariæ SMITH, List Lepid. N. Am. 1891, p. 21; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 132.

Male.—Head black, palpi yellow with a black stripe outside; collar and underside of thorax yellow. Antennæ black. Thorax black, patagia tipped with yellow at the posterior end or with a yellow line. Femora black, tibiæ black outside, with a yellow band, yellow inside; tarsi yellow. Anterior coxæ yellow. Abdomen black, with a rather broad yellow band on the second and fourth segments, sometimes edged on each side with yellow points. Anal tuft black above, yellow on each side beneath and at the middle. Fore wings with borders rather broad, brown black, slightly violaceous; between the veins, along the broad outer border, are traces of yellow rays, more or less distinct. Discal mark large; basal transparent area small and triangular; outer area small and round. Underside streaked and washed with golden yellow. Hind wings transparent, bordered with brown black and a few yellow hairs at the base of the inner margin. Underside with costa yellow and a line of the same color in the outer and inner margins.

Female.—Head black, palpi and collar yellow. Antennæ black. Thorax black, with a yellow stripe along each side and a small transverse yellow spot on the posterior portion; thorax yellow beneath. Abdomen black, a yellow band on each of the second, fourth, fifth, and sixth segments, sometimes the band on the fifth segment absent, or with a band on the first, second, fourth, and sixth segments. Anal tuft yellow, black at the base and middle above. Legs similar to those of the male, but yellower. Fore wings blackish brown, bright orange between the veins in the opaque portions. Transparent area smaller than in the male. Underside washed and rayed with golden yellow. Hind wings transparent, outer border brown with a more or less distinct golden yellow line. Underside with the yellow line distinct.

Expanse: Male and female, 13–22 mm.

Habitat.—Nova Scotia, Northern New York, Minnesota, Utah, Nevada, Colorado, Idaho, Texas, California, Oregon, Washington, Vancouver, British Columbia.

Types: One female; *Æ. hemizonæ*, three females; *Æ. lupini*, three males and three females; *Æ. impropria*, one male; *Æ. washingtonia*, one male; *Æ. madariæ*, one male and one female. Coll. Hy. Edwards, Am. Mus. Nat. Hist.; *Æ. aureola*, one female. Coll. E. L. Graef; *Æ. perplexa*, one male. Coll. B. Neumogen, Brooklyn Inst. Arts and Sciences.

Larva.—"Normal (*S. exitiosa*), and almost absolutely like *S. albicornis*. The area about the mouth seems more uniformly dark; otherwise the same description will apply." (DYAR, MS.)

This species appears to be most common along the Pacific coast, where it is a pest to the strawberry. The larva makes a large irregular channel in the crown or main roots, usually killing the plant. The moths make their appearance late in June and are on the wing until late in July. The larva also infests the roots and lower parts of the canes of the common garden raspberries and blackberries.

Sesia arctica Beuten.

PLATE XXXIII, FIG. 17, MALE.

Sesia arctica BEUTENMÜLLER, Can. Ent. Vol. XXXII, 1900, p. 208.

Male.—Head, palpi, and thorax entirely black. Abdomen black, with a narrow white band at the posterior edge of the second and fourth segments. Anal tuft black. Legs black, with the hind tarsi dirty white. Fore wings transparent, with black borders and a broad black transverse mark. Hind wings transparent, with a narrow black margin. Underside of fore wings washed with golden yellow basally; hind wings same as above.

Expanse: 20 mm.

Habitat.—Kodiak, Alaska.

Type: One male. Coll. U. S. Nat. Mus.

Somewhat allied to *Sesia rutilans*, but has white bands instead of yellow ones as in that species. The palpi are wholly black, while in *rutilans* they are golden yellow and black. The female is not known. The moth appears in July.

Sesia neglecta (Hy. Edw.).

PLATE XXXIII, FIG. 16, FEMALE.

Ageria neglecta HY. EDWARDS, Papilio, Vol. I, 1881, p. 197; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 173.

Sesia neglecta SMITH, List Lepid. N. Am. 1891, p. 20; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 132.

Female.—Head black, dirty yellow on top; palpi yellow. Antennæ black. Thorax black, with narrow lateral and basal pale yellow stripes. Abdomen black, with second and fourth segments narrowly banded posteriorly with pale yellow. Anal tuft yellow. Legs yellow and black. Fore wings nearly opaque, the usual vitreous spaces being clothed with scales, purplish brown or golden yellow on the outer part and along the inner margin; underside more or less golden yellow, sometimes entirely of this color. Hind wings transparent, outer margin purplish or more or less golden yellow with the fringes darker. Underside similar to the above.

Expanse: 15-17 mm.

Habitat.—California, Washington.

Type: One female. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

The opaque fore wings and two yellow bands on the abdomen will serve to distinguish this species from its nearest ally, *S. rutilans*. The male and earlier stages are not known.

Sesia refulgens (Hy. Edw.).

PLATE XXXII, FIG. 21, FEMALE.

Ageria refulgens HY. EDWARDS, Papilio, Vol. I, 1881, p. 199; GROTE, New Check List N. Am. Moths, 1882, p. 12.

Sesia refulgens SMITH, List Lepid. N. Am. 1891, p. 20; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 132.

Female.—Head and antennæ black, palpi and collar yellow. Thorax black, with a yellow band across the posterior portion and a few yellow hairs at the posterior end of the patagia. Abdomen black, with a yellow band on the second, fourth, and sixth segments, and a trace of another yellow band on the fifth segment. Anal tuft black, yellow at the sides above. Legs yellow and black, femora black, tibiæ yellow with a black band, tarsi yellow. Fore wings violet brown, marked with orange in the usual transparent parts; discal mark orange outside. Underside of wings brighter than above, the intronervular spaces being bright golden orange. Hind wings transparent, with a violet brown border, underside bright orange along the costa.

Expanse: 18 mm.

Habitat.—Georgia.

Type: One female. Coll. F. Tepper, Agricul. College, Michigan.

Allied to *S. rutilans*, but it has the transparent areas of the fore wings almost filled with golden brown and the transverse mark is reddish orange outside. The male and early stages are not known.

Sesia bassiformis (Walker).

PLATE XXXI, FIG. 3, MALE; PLATE XXXIII, FIG. 4, FEMALE.

- Ageria bassiformis* WALKER, Cat. Lepid. Brit. Mus. Pt. VIII, 1856, p. 39; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. V, 1893, p. 24.
Trochilium bassiformis MORRIS, Synop. Lepid. N. Am. 1862, p. 331.
Sesia bassiformis BOISDUVAL, Suites à Buffon, Nat. Hist. Lepid. Het. I, 1874, p. 434; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 133; *ibid.* Vol. IX, 1897, p. 219.
Trochilium lustrans GROTE, Can. Ent. Vol. XII, 1880, p. 213.
Ageria lustrans GROTE, New Check List N. Am. Moths, 1882, p. 12; WEED, Am. Nat. Vol. XXIII, 1889, pl. xliii, Fig. 6; KELLCOTT, Can. Ent. Vol. XXIV, 1892, p. 46.
Sesia lustrans SMITH, List Lepid. N. Am. 1891, p. 21; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 173; *ibid.* Vol. V, 1893, p. 25; *ibid.* Vol. VI, 1894, p. 92.
Ageria consimilis HY. EDWARDS, Papilio, Vol. I, 1881, p. 194; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 173.
Sesia consimilis SMITH, List Lepid. N. Am. 1891, p. 20.
Ageria bollii HY. EDWARDS, Papilio, Vol. I, 1881, p. 191; GROTE, New Check List N. Am. Moths, 1882, p. 12.
Sesia bollii SMITH, List Lepid. N. Am. 1891, p. 20.
Ageria eupatorii HY. EDWARDS, Papilio, Vol. I, 1881, p. 195; GROTE, New Check List N. Am. Moths, 1882, p. 20; BEUTENMÜLLER, Ann. N. Y. Acad. Sc. Vol. V, 1890, p. 205; Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 173.
Sesia eupatorii SMITH, List Lepid. N. Am. 1891, p. 20.
Ageria sexfasciata HY. EDWARDS, Papilio, Vol. I, 1881, p. 193; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 173.
Sesia sexfasciata SMITH, List Lepid. N. Am. 1891, p. 20.
Ageria infirma HY. EDWARDS, Papilio, Vol. I, 1881, p. 195; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Ann. N. Y. Acad. Sc. Vol. V, 1890, p. 205.
Sesia infirma SMITH, List Lepid. N. Am. 1891, p. 20.
Ageria imitata HY. EDWARDS, Papilio, Vol. I, 1881, p. 196; GROTE, New Check List N. Am. Moths, 1882, p. 12.
Sesia imitata SMITH, List Lepid. N. Am. 1891, p. 20; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 133.

Male.—Head metallic bronzy black, orbits white, collar and palpi yellow. Antennæ

black with a bluish lustre. Thorax metallic bronzy black with a distinct yellow line on each side and a small yellow transverse mark posteriorly. Thorax beneath with a yellow spot on each side. Abdomen narrow, slender, violet brown black, with a narrow yellow ring on the first to fourth inclusive, and sixth and seventh segments. Anal tuft large, fan-like, brown black, yellow on each side beneath. Underside of abdomen yellow along the middle. Legs yellow washed with brown on one side. Fore wings transparent, with narrow metallic bronzy borders. Outer border rather broad, with a few yellow rays between the veins; discal mark straight. Underside washed with yellow. Hind wings transparent, with very narrow, metallic bronzy margin; underside similar.

Female.—Much heavier than the male. Abdomen with only five yellow bands instead of six, one on each of the first to fourth segments and one on the sixth segment, the last two bands are twice as wide as the rest. Anal tuft yellow, with a few brown black hairs. Antennæ with a long white patch before the apex.

Expanse: Male, 18–20 mm.; female, 22–26 mm.

Habitat.—New York, Massachusetts, southward to Texas and westward to Nebraska and Colorado.

Types: *Ægeria bassiformis*. Coll. Brit. Mus.; *Æ. lustrans*, one female; *Æ. eupatorii*, one female; *Æ. consimilis*, one male; *Æ. sexfasciata*, one male. Coll. Hy. Edwards, Am. Mus. Nat. Hist.; *Æ. imitata*, one female. Coll. B. Neumoegen, Brooklyn Inst. Arts and Sciences.

A well-marked species, readily known by the golden bronze margins of the fore wings and by the bright yellow bands on the abdomen. The larva lives in the stems of the trumpet-weed (*Eupatorium purpureum*).

Sesia tipuliformis (Clerck).

PLATE XXXI, FIG. 19, FEMALE.

Sphinx tipuliformis CLERCK, Icones Insect. Rariorum, 1759, pl. iv, fig. 1; LINNÉ, Fauna Suecia, 2nd Ed. 1761, p. 289; Syst. Nat. 12th Ed. 1766, p. 804; HOULTYN, Linnæus, Nat. Hist. Besch. Dieren, Insect. Vol. XI, 1767, p. 467; SCHÆFFER, Icon. Ins. Ratisbonam, 1767, pl. cxxxv, fig. 56 (no name); HARRIS, Exp. Eng. Ins. 1776, pl. iii, fig. 8; 2nd Ed. 1782, pl. iii, fig. 8; DEGEER, Mem. Hist. Ins. Vol. II, 1771, p. 230, pl. ii, fig. 12; MÜLLER, Nat. Syst. Pt. V, 1774, p. 644; DENIS & SCHIFFMÜLLER, Schmett. Wien. Geg. 1776, p. 44; GLADBACH, Europ. Schmett. 1777, p. 60, pl. xxvi, figs. 5–6; GMELIN, 13th Ed. Linn. Nat. Syst. Vol. I, 1778, p. 2388; FUßSLY, Mag. Liebh. Ent. Vol. I, 1778, pp. 115, 133; GÖTZE, Abh. Gesch. Insect. Vol. II, 1778, p. 165, pl. ii, fig. 12; ESPER, 1779, p. 131, pl. xv, fig. 3; ENGRAMMELLE, Pap. Europ. Vol. III, 1782, p. 41, pl. xciv; RETZIUS, Gen. et Spec. Insect. 1783, p. 33; SCHRANK, Fuessly Neues Mag. Liebh. Ent. Vol. II, 1785, p. 204; VIEWEG, Verz. Churmark Brandenburg, Schmett. Pt. I, 1789, p. 19; BORKHAUSEN, Nat. Europ. Schmett. Pt. II, 1789, p. 127; Rhein. Mag. Naturk. Vol. I, 1793, p. 310; DE VILLERS, Linnæi Ent. Faun. Suec. Vol. II, 1789, p. 101; JUNG, Verz. bek. Schmett. 1781, p. 241; DONAVAN, Nat. Hist. Brit. Ins. Vol. II, 1793, p. 41, pl. lii, fig. 53; ROSSI, Mant. Insect. Vol. II, 1794, p. 16; HÜBNER, Sam. Europ. Schmett. Schwärmer, 1796, p. 92, pl. viii, figs. 49 and 51; HAWORTH, Cat. Brit. Lepid. 1802, p. 6; STEWART, Elem. Nat. Hist. Vol. II, 1802, p. 139; *ibid.* 2nd Ed. 1817.

Sesia tipuliformis FABRICIUS, Syst. Entomol. 1775, p. 549; Spec. Insect. Vol. II, 1781, p. 157; Mant. Insect. Vol. II, 1787, p. 99; Ent. Syst. Vol. III, 1793, p. 382; GMELIN, Linn. Syst. Nat. Vol. I, Pt. V, 1789, p. 2390; ZSCHACH, Mus. Leskeanum, Ent. Syst. Fabricius, 1778, p. 96; ROSSI, Fauna Etrusca, Vol. II, 1790, p. 165; BERGSTRÄSSER, Epit. Ent. Fabricianæ, 1797, p. 147; SCHRANK, Fauna Boica, Vol. II, 1801, p. 234; LASPEYRES, Sesia Europ. 1801, p. 28; OLIVER et LATREILLE, Nouv. Dict. Hist. Nat. Vol. IX, 1803, p.

445; *ibid.* Vol. XXXI, 1819, p. 105; LATREILLE, Nat. Hist. Crus. et Ins. Vol. XIV, 1805, p. 156; TURTON, Syst. Nat. Linné, Vol. III, 1806, p. 181; ILLIGER, Mag. Insectenk. Vol. VI, 1807, p. 294; OCHSENHEIMER, Schmett. Europa, Vol. II, 1808, p. 171; DALMAN, Kongl. Vetens. Acad. Handl. 1816, p. 217; GODART, Hist. Nat. Lep. 1821, p. 114, pl. xxi, fig. 15; OLIVER, Encycl. Meth. 1825, pl. lxvii, fig. 6; RISSO, Hist. Nat. Europ. Merid. Vol. V, 1826, p. 237; MEIGEN, Handb. Schmett. Liebh. 1827, p. 89; BOITARD, Man. Ent. Nat. Hist. Ins. 1828, p. 319; CHILDREN, Philos. Mag. and Ann. Nat. Hist. 1829; BOISDUVAL, Europ. Lep. Ind. Meth. 1829, pp. 29, 30; LUCAS, Hist. Nat. Lepid. 1834, p. 98, pl. lii; LAMARCK, Hist. Nat. sans Vert. Vol. IV, 1835, p. 230; ZETTERSTEDT, Insect. Lapponica, 1840, p. 919; BOISDUVAL, Gen. Index Meth. Europ. Lepid. 1840, pp. 42-43; EVERSMAAN, Fauna Lepid. Volga Ural. 1844, p. 104; BLISSON, Ann. Soc. Ent. Fr. 1845 (46), pp. 208 and 216; HERRICH-SCHÄFFER, Europ. Schmett. Vol. II, 1845, p. 72; ZELLER, Isis, 1840, p. 142; FIXSEN, Bull. Soc. Nat. Mosc. Vol. XXIII, 1849, p. 170; SCHMIDT, Verz. Preuss. Schmett. 1851, p. 8; ANON. Ann. Soc. Ent. Belg. Vol. I, 1851, p. 33; NICKERL, Synop. Lepid. Faun. Bohmen, 1851, p. 25; LEDERER, Verh. Zool.-Bot. Ver. Wien, 1852, p. 67; CHENU et LUCAS, Encyl. Hist. Nat. 1856, p. 239; GLASER, Nat. Insect. 1857, p. 146; HEINEMANN, Schmett. Deutsch. and Schweiz, 1859, p. 125; KRANZ, Schmett. um München, 1860, p. 23; NOWICKI, Enum. Lepid. Orient. 1860, p. 24; WILDE, Syst. Besch. Raupen, 1861, p. 92; MEYER-DÜR, Mit. Schweiz. Ent. Gesell. Vol. I, 1862, p. 32; DOUBLEDAY, Synon. List. Brit. Butt. and Moths, 1859, p. 3; 3rd Ed. 1862; LEDERER, Wien. Ent. Monatsch. Vol. VII, 1863, p. 20; SIEVERS, Horæ Soc. Ent. Ross. 1863, p. 140; GRAAF, Tijds. Ned. Ent. Ver. 1863, p. 155; GAVERE, Tijds. Ned. Ent. Ver. 2 ser. Vol. II, 1867, p. 198; DIETRICH, Mit. Schweiz. Ent. Gesell. Vol. II, 1868, p. 337; FEREDAY, Ent. Month. Mag. Vol. VI, 1869, p. 116; HEY-LÆRTS, Tijds. Ned. Ent. Ver. 2 ser. Vol. V, 1870, p. 147; TASCHENBERG, Ent. Gärt. und Gartenfreunde, 1871, p. 210; CLIFFORD, The Entomol. 1871, p. 460; WOOD, Ins. at Home, 1872, p. 427; WOCKE, Zeitsch. Ent. Breslau, 1872, p. 16; KANE, The Entomol. Vol. XXVI, 1873, p. 273; FREY and WULLSCHLEGEL, Mit. Schweiz. Ent. Gesell. Vol. IV, 1874, p. 214; DUBOIS, Lepid. Belg. Vol. I, 1874, pl. cxiii, fig. 2; BOISDUVAL, Suites à Buffon, Nat. Hist. Lepid. 1874, p. 400; HUGUENIN, Mit. Schweiz. Ent. Gesell. Vol. VII, 1878, p. 318; TASCHENBERG, Pract. Insectentk. Pt. III, 1880, p. 18; GLASER, Klienthier. Nutz. und Schad. 1886, p. 196; HOFFMANN, Schmett. Europ. 1887, p. 29; Raupen Europa, 1893, p. 32, pl. ix, fig. 6; SMITH, Cat. Ins. N. J. 1890, p. 289; Rep. Ent. Agri. Exp. St. N. J. 1895 (1896); WEED, Ann. Rep. Columbus Hort. Soc. 1890 (1891), p. 166; GILLETTE, Bull. 17, Agricul. Exp. St. Colorado, 1892, p. 21; Col. St. Bd. Hort. 1892, p. 230; Bull. 47, Agricul. Coll. Colorado, 1898, p. 24; OSBORN, Orange Judd Farmer, 1891, p. 340; STEINERT, Deutsch. Ent. Gesell. (Iris) Berlin, Vol. V, 1892, p. 401; CARADJA, Deutsch. Ent. Zeit. (Iris) Berlin, Vol. VI, 1893, p. 190; GIBB, Can. Ent. Vol. XXV, 1893, p. 179; PERKINS, 3rd Rep. Vermont Agricul. Exp. St. 1894 (1895), p. 130; LUGGER, Bull. 43, Agricul. Exp. St. Minn. 1895, p. 184, pl. v, fig. 45; 1st Rep. Agricul. Exp. St. Minn. 1895 (1896), p. 88, pl. v, fig. 45; *ibid.* 4th Rep. 1898 (1899), pp. 60-64, pl. ix, fig. 62; COMSTOCK, Man. Study Ins. 1895, p. 261; PAYNE, The Entomol. Vol. XXVIII, 1895, p. 51; SOUTH, The Entomol. Vol. XXVIII, 1895, p. 45; PIPER, Bull. 17, Wash. Agri. Exp. St. 1895; PERKINS, 8th Rep. Vermont Bd. Agri. 1895, p. 130; TUTT, Brit. Moths, 1896, p. 346, pl. xii; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 138; *ibid.* Vol. IX, 1897, p. 220.

Trochilium tipuliformis LEACH, Edinburgh Encyclo. Vol. IX, 1815, p. 131; STEPHENS, Syst. Cat. Brit. Ins. 1829, p. 36; MORRIS, Synop. Lepid. N. Am. 1862, p. 140.

Trochilium tipuliforme NEWMAN, Ent. Mag. 1832, p. 178; FITCH, 3rd Rep. Nox. Ins. N. Y. 1856, p. 423; STEPHENS, Cat. Brit. Lepid. 1856, p. 30; Man. Brit. Butt. and Moths, 1857, p. 107; HUMPHREY & WESTWOOD, Brit. Moths, 1857, p. 39, pl. vii, fig. 9; HUMPHREY, Gen. Brit. Moths, 1858, p. 13, pl. iv, fig. 4; WAKEFIELD, Trans. Ent. Soc. Lond. 1869, p. xvi;

- PACKARD, Am. Nat. Vol. II, 1869, p. 219; BUCKLER, Larva Brit. Butt. and Moths, Vol. II, 1887, pp. 49, 128; MEYRICK, Handb. Brit. Lepid. 1895, p. 565.
- Bembecia tipuliformis* HÜBNER, Verz. bek. Schmett. 1816, p. 129.
- Egeria tipuliformis* STEPHENS, Brit. Ent. Haust. Vol. I, 1828, p. 142; Nom. Brit. Ins. 1829, p. 39; SAMOUELLE, Ent. Comp. Brit. Ins. 1819, p. 397; *ibid.* 1824; Nom. Brit. Ent. 1819; RENNIE, Conspect. Brit. Butt. and Moths, 1832, p. 28; DOUBLEDAY, Ent. Mag. Vol. III, 1836, p. 385; WESTWOOD, Intro. Class. Ins. 1840, p. 372; KIRBY & SPENCE, Intro. Ent. 6th Ed. 1843, p. 162; WOOD, Index Ent. 1839, p. 15, pl. iv, fig. 32; *ibid.* c. 1845; *ibid.* 1854; HARRIS, New Eng. Farm. Vol. V, 1826, p. 170; Am. Journ. Arts and Sc. Vol. XXXVI, 1838, p. 312; HOVEY, Mag. Hort. Vol. XVII, 1851, pp. 241-244, fig.; Ins. Inj. Veget. 1841, p. 234; *ibid.* 1852, 255; *ibid.* 1862, p. 334; *ibid.* 1863; WALSH, Pract. Ent. Vol. I, 1865, p. 27; RILEY, Prairie Farm. 1867, p. 27; Am. Encycl. Stoddard, 1883, p. 69; PACKARD, Guide Study Ins. 1869, p. 279 and other edit.; LINTNER, 23rd State Cab. Rep. 1869 (1872), p. 60; Ent. Cont. III, 1874, p. 179; 2nd Rep. Inj. Ins. N. Y. 1885, p. 61; BOWLES, Can. Ent. Vol. III, 1871, p. 9; SAUNDERS, Rep. Ent. Soc. Ont. 1871, p. 381; *ibid.* 1879 (1880), p. 76; Ins. Inj. Fruit, 1883, p. 336; *ibid.* 2nd ed. 1899, p. 336; GOTT, Rep. Ent. Soc. Ont. 1877, p. 42; COOK, Cult. and Count. Gent. 1875, p. 438; Proc. Mich. Hort. Soc. 1890 (1891), p. 106; TREAT, Ins. Inj. Fruit, 1881, p. 25; PERKINS, 4th Rep. Vermont Bd. Agricul. 1877, p. 152; *ibid.* 5th Rep. 1878, p. 261; HOFFMEISTER, Ann. Rep. Iowa Hort. Soc. 1877 (1878), p. 245; THOMAS, 1st Rep. Nox. Ins. Ill. 1876 (1878), p. 39; *ibid.* 2nd Rep. 1877 (1878), p. 172; MARTIN, 5th Rep. Nox. Ins. Ill. Thomas, 1880 (1881), p. 107; COQUILLETT, 5th. Rep. Nox. Ins. Ill. 1880 (1881), p. 151; FULLER, Am. Ent. Vol. III, 1880, p. 93; KELLCOTT, Can. Ent. Vol. XIII, 1881, p. 7; *ibid.* Vol. XXIV, 1892, p. 46; HY. EDWARDS, Papilio, Vol. II, 1882, p. 56; BETHUNE, Ent. Soc. Ont. 1887 (1888), p. 54, figs. 8 and 9; HY. EDWARDS, Ent. Amer. Vol. III, 1888, p. 224; WEED, Prairie Farm. Vol. LVIII, 1886, p. 233; Am. Nat. Vol. XXIII, 1889, p. 1108, pl. xliii, fig. 4; TOWNSEND, Insect Life, Vol. II, 1889, p. 42; HILLMAN, Orch. and Gard. 1889, p. 178; BEUTENMÜLLER, Ann. N. Y. Acad. Sc. Vol. V, 1890, p. 205; FLETCHER, Bull. 11, Dept. Agricul. Ottawa, 1891, p. 21; FERNALD, Stand. Nat. Hist. Vol. II, 1884, p. 464; LUGGER, Ins. Inj. to Small Fruit, p. 7-8; Rep. Minn. Hort. Soc. 1890; WEBSTER, Trans. Ind. Hort. Soc. 1886 (1887), p. 111; BRUNER, Rep. Neb. Hort. Soc. 1891, p. 195.
- Setia tipuliformis* MEIGEN, Syst. Besch. Europ. Schmett. Vol. II, 1830, p. 119, pl. xlii, figs. a and b.

Male.—Head purplish black, orbits white; palpi yellow below, black above. Antennæ black, yellowish beneath. Collar yellow. Thorax purplish black, with a narrow yellow stripe on each side, and a large yellow patch on each side beneath. Abdomen purplish black, with a narrow yellow ring on the second, fourth, and last two segments. Anal tuft black with a bluish lustre. Legs purplish with two yellow bands on the tibiæ, tarsi yellow on one side. Fore wings transparent with golden purple borders, the outer one very broad and marked with golden yellow streaks between the veins. Discal mark broad, black with a purplish lustre. Underside with costal and inner margin golden yellow, discal mark same as above, and the outer golden streaks bright yellow. Hind wings transparent, border purplish. Underside same as above.

Female.—Same as the male in color, but with three yellow bands on the abdomen instead of four.

Expanse: Male and female, 15-21 mm.

Habitat.—Europe, Asia, North America, Australia, and New Zealand.

Larva.—"Slender, with proportionately small head; otherwise normal (*S. exitiosa*). Basal depression of clypeus punctiform, no other; paraclypeal pieces following the outline of clypeus, rounded above and constricted opposite the top of clypeus, not so below; dark brown, shining, smooth, mouth black. Segments with central annulet small, elevated. Cervical shield concolorous,

only faintly cut at the corners by the curved groove. Spiracles minute, brown edged. Crochets 21 to 14 in a row, small. Tubercles rather large, a little elevated, an elevation without setæ also above and behind spiracles, another behind iv + v and another before vi. Setæ minute. White, no marks." —(DYAR, MS.)

One of the most common and well-known species. The sexes are similar in color and markings, but the female has only three yellow bands on the abdomen, while the male has four. The insect is an importation from Europe, and in the larval stage it is sometimes very injurious to different kinds of currants and gooseberries. The eggs are deposited in the crevices of the bark on the canes and the larva lives in the pith of the same, making long tunnels sometimes several feet in length. The larva hibernates in its tunnel, and the moth emerges during the latter part of May and during June, the year following. The species has the widest range of distribution of all the Sesiidæ, and its literature is very extensive.

Sesia arizonæ Beuten.

PLATE XXXII, FIG. 31, FEMALE.

Sesia arizonæ BEUTENMÜLLER, Jour. N. Y. Ent. Soc. Vol. VI, 1898, p. 240.

Female.—Head black, orbits white, palpi yellow, collar edged with yellow. Antennæ black. Thorax black with a yellow stripe on each side and a transverse, yellow mark at the posterior end. Thorax on each side below with a yellow patch. Abdomen black, with a narrow yellow band on each of the first, second, third, fifth, and sixth segments; fourth segment with a very broad band. Anal tuft yellow black at the sides. Legs yellow, tibiæ banded with black. Fore wings with costal margin and fringes blackish, outer part between the veins and inner margin bright golden orange. Discal mark almost entirely golden orange. Basal transparent area, elongate, outer one small. Underside bright orange. Hind wings transparent, margin narrow, partly orange towards the apex, fringes brown. Underside with costal and outer margin bright orange.

Expanse: 23 mm.

Habitat.—Arizona, Texas.

Type: One female. Coll. Am. Mus. Nat. Hist.; one female. Coll. U. S. Nat. Mus.

A well-marked species readily known by the bright yellow bands on the abdomen and the golden orange markings on the fore wings. The male and the early stages are unknown.

Sesia morula (Hy. Edw.).

PLATE XXXI, FIG. 18, FEMALE.

Egeria morula HY. EDWARDS, Papilio, Vol. I, 1881, p. 196; GROTE, New Check List N. Am. Moths, 1882, p. 12.

Sesia morula BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 142.

Male.—Head black, palpi sordid white. Antennæ black. Thorax brown black with a very narrow white lateral line. Abdomen deep brown black with a narrow sordid white band on each of the second, fourth, and last two segments. Anal tuft black, sordid white beneath. Legs black, spurs and underside of tarsi white. Fore wings with the margins and discal mark broadly black,

transparent spaces filled with sordid white; underside sordid white, except the discal mark, nervules, apex, and posterior margin, which are black. Hind wings transparent, margin very narrow, black.

Expanse: 20 mm.

Habitat.—Texas.

Type: One male. Coll. B. Neumoegen, Brooklyn Inst. Arts and Sciences.

The usual transparent areas of the fore wings are filled with white in this species, and the margins of the wings are very broad. The abdomen has four very narrow white bands. The female and early stages are unknown, and the type is the only specimen known to exist in collections.

Sesia novaroënsis (Hy. Edw.).

PLATE XXXI, FIG. 14, FEMALE.

Egeria novaroënsis HY. EDWARDS, Papilio, Vol. I, 1881, p. 199; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 172.

Sesia novaroënsis SMITH, List Lepid. N. Am. 1891, p. 20; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 133.

Male.—Head, palpi, and collar rich orange red. Antennæ black. Thorax black, with the patagia and a large spot at the posterior portion rich orange red; underside of thorax wholly orange. Abdomen black, with a broad orange red band on the posterior end of each segment, except the last. Anal tuft orange red. Abdomen beneath wholly orange red. Legs orange red with black bands. Fore wings transparent, narrow, opalescent, with bluish black borders and prominent discal mark. Underside like above, but orange basally. Hind wings transparent, discal mark slight and with narrow bluish black margin; underside same as above.

Female.—Similar to the male, but the hind tibiæ and tarsi are dusky.

Expanse: Male, 30–34 mm.; female, 35 mm.

Habitat.—California, Washington.

Type: Two females. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

This species may be known at a glance by its large size, narrow black margins of the wings, and orange bands on the abdomen. Early stages unknown.

Sesia rubrofascia (Hy. Edw.).

PLATE XXXIII, FIG. 6, MALE.

Egeria rubrofascia HY. EDWARDS, Papilio, Vol. I, 1881, p. 191; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 134.

Male.—Head, palpi, thorax, and antennæ black with a slight metallic lustre. Abdomen black with the fourth and fifth segments wholly red. Anal tuft black. Legs black, tarsi sordid white. Fore wings transparent with the opaque parts purplish black; costal and inner margins very narrow. The discal mark is very long, both its edges being almost straight, outer part of wing very broad, thus leaving only a rather small, subquadrate outer transparent area; basal transparent area broad and long. Beneath the fore wings are somewhat brighter than above. Hind wings transparent with a very narrow purplish black outer border.

Expanse: 20 mm.

Habitat.—Georgia.

Type: One male. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Only the type specimen is known to exist in collections. The species may be readily known by its black color with the fourth and fifth segments red.

Sesia bolteri (Hy. Edw.).

PLATE XXXII, FIG. 32, FEMALE.

Ageria bolteri HY. EDWARDS, Papilio, Vol. III, 1883, p. 155; Ent. Amer. Vol. III, 1888, p. 224; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 172.

Sesia bolteri SMITH, List Lepid. N. Am. 1891, p. 20.

Sesia rubrofascia BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IX, 1897, p. 215 (in error).

Male.—Head and thorax deep steel blue black, orbits pure white; palpi above black, bright orange beneath. Antennæ deep steel blue black, with the tip, for one third the length, yellowish on one side. Abdomen deep steel blue black, with the fourth and fifth segments bright scarlet red above and below. Anal tuft blue black tipped with white. Legs blue black, tibiae tufted with white; tarsi pale yellow. Fore wings transparent, costal and inner border narrow, deep black with a steel blue lustre; discal mark straight; outer margin broad and heavily scaled with scarlet or coppery red between the black veins; fringes violet brown. Underside brighter than above, costal and inner margin pale yellow. Hind wings transparent, outer margin very narrow, black; fringes violet brown. Underside same as above.

Female.—Larger and more robust than the male. The red on the fore wings is usually brighter; the sixth segment is red beneath, and the hind tarsi are bright orange, otherwise same as the male.

Expanse: Male and female, 12–20 mm.

Habitat.—New York, New Jersey, Illinois, Manitoba.

Type: One female. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Closely allied to *S. rubrofascia*, but readily distinguishable by the orange red color between the veins on the outer parts of the fore wings and by the palpi being orange beneath. The larva lives in the canes of willow. (Plate XXXV, Fig. 4.)

Sesia fulvipes (Harris).

PLATE XXXI, FIG. 28, MALE.

Ageria fulvipes HARRIS, Am. Journ. Arts and Sciences, Vol. XXXVI, 1839, p. 312; WALKER, Cat. Lepid. Brit. Mus. Pt. VIII, 1856, p. 44; GROTE, New Check List N. Am. Moths, 1882, p. 12.

Sesia fulvipes BOISDUVAL, Suites à Buffon, Nat. Hist. Lepid. Het. I, 1874, p. 439; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 135.

Male.—Head, antennæ, thorax, and abdomen above deep black with a metallic blue lustre. Palpi bright orange red beneath, black above. Abdomen beneath with the first, second, and third segments bright orange. Legs bright orange, femora blue black. Thorax beneath with a large orange patch on each side. Fore wings transparent, opalescent, with borders very narrow, deep blue black. Discal mark narrow, straight, blue black, marked with a little orange outside. Base of wings marked with a few orange scales. Fore wings beneath scaled with light orange along the costa and inner margins. Hind wings transparent, margins very narrow, blue black.

Female.—Like the male, but the outer margins of the fore wings are somewhat broader.

Expanse: Male and female, 22 mm.

Habitat.—Canada, New England States.

Type: One male. Coll. T. W. Harris, Boston Soc. Nat. Hist.

Nothing is known about the life-history of this plainly marked species. It

may be recognized by the bright orange legs, very narrow margins of the wings, and by the three basal abdominal segments being orange beneath.

Sesia saxifragæ (Hy. Edw.).

PLATE XXXI, FIG. 1, FEMALE.

Ægeria saxifragæ HY. EDWARDS, Papilio, Vol. I, 1881, p. 190; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 173; *ibid.* Vol. VI, 1894, p. 91.

Sesia saxifragæ SMITH, List Lepid. N. Am. 1891, p. 20; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 135.

Ægeria henshawii HY. EDWARDS, Papilio, Vol. II, 1882, p. 56; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 173.

Sesia henshawii SMITH, List Lepid. N. Am. 1891, p. 20.

Male.—Head, thorax above and abdomen wholly black with a bronzy lustre. Palpi orange, tips black. Thorax beneath with an orange patch on each side. Legs orange, femora black. Fore wings transparent, with borders black with a blue or violet lustre. Costal and inner border narrow; outer border broad. Discal mark large and conspicuous; base of wings with a few orange scales. Underside orange along the costa. Hind wings transparent, with outer margin narrow, blue or violet black. Discal mark small. Underside same as above.

Female.—Similar to the male, but the palpi are black above and at the tips, orange beneath. The legs are washed with black and the discal mark on the fore wings is marked with orange. Otherwise the same as the male.

Expanse: Male and female, 18–23 mm.

Habitat.—Labrador, Colorado.

Types: One male; *Ægeria henshawii*, one male. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Closely allied to *S. fulvipes* in color and general appearance. It differs from that species by the absence of the orange on the first three abdominal segments beneath and by having the margins of the fore wings much broader, thus reducing the transparent spaces. Its life-history is not known.

Sesia pictipes (G. & R.)

PLATE XXXI, FIG. 10, FEMALE.

Ægeria pictipes GROTE & ROBINSON, Trans. Am. Ent. Soc. Vol. II, 1868, p. 182, pl. II, fig. 64; BAILEY, N. Am. Entomol. Vol. I, 1879, pp. 17–21, pl.; KELLICOTT, Can. Ent. Vol. XIII, 1881, p. 7; *ibid.* Vol. XXIV, 1892, p. 46; MARTIN, 5th Rep. Nox. Ins. Ill. (Thomas), 1880 (1881), p. 109; GROTE, Bull. U. S. Geol. Surv. Hayden, Vol. IV, 1881, p. 257; New Check List N. Am. Moths, 1882, p. 12; FERNALD, Stand. Nat. Hist. Vol. II, 1884, p. 464; WEED, Am. Nat. Vol. XXIII, 1889, p. 1108, fig.; BEUTENMÜLLER, Ann. N. Y. Acad. Sc. Vol. V, 1890, p. 204; Bull. Am. Mus. Nat. Hist. Vol. V, 1893, p. 251.

Sesia pictipes SMITH, Cat. Ins. N. J. 1890, p. 289; List Lepid. N. Am. 1891, p. 20; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 134; *ibid.* Vol. IX, 1897, p. 220; WEBSTER, Bull. Agricul. Exp. St. Ohio, No. 68, 1896, p. 25; LUGGER, 4th Rep. Ent. Agricul. Exp. St. 1898 (1899), p. 65, fig. 63.

Egeria inusitata HY. EDWARDS, Papilio, Vol. I, 1881, p. 201; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 172.

Male.—Head blue black, sometimes with a few yellow hairs between the antennæ, palpi pale yellow, black above. Collar at the sides pale yellow. Thorax blue black with a narrow pale yellow line on each side. Abdomen blue black with a very narrow pale yellow ring on the second and fourth segments; the ring on the fourth segment encircles the body, or is only present beneath and sometimes in form of a patch. Anal tuft hastate, blue black narrowly edged with white at the sides. Legs blue black, with pale yellow tufts on the tibiæ, and yellow rings on the tarsi; anterior coxæ marked with yellow. Fore wings transparent, with the margins very narrow, blue black; discal mark narrow, straight. Sometimes the inner margin is scaled with pale yellow. Underside with inner and costal margins, and discal mark scaled with pale yellow. Hind wings transparent, no discal mark and with very narrow outer margin; fringes becoming whitish towards the base. Underside like the upper.

Female.—Same as the male, but more robust, with straight anal tuft and simple antennæ.

Expanse: Male, 15–20 mm; female, 20–26 mm.

Habitat.—Canada to Florida and Texas, westward to the Pacific.

Type: Lost. *Egeria inusitata*, one female. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Larva.—"Normal (*S. exitiosa*). Epicranial lobes meeting in a point, the paraclypeal pieces almost reaching the vertex; clypeus not distinctly truncate at the lower corners; paraclypeal pieces rounded at the vertex and narrowed centrally. Cervical shield luteous brown, pale, nearly white centrally. Crochets of abdominal feet 14 to 17 in a row. Middle annulet narrow and higher than the others." (DYAR, MS.)

The sexes of this species are very similar and resemble the male of *Sanninoidea exitiosa*, from which the species differs by having only two yellow rings on the abdomen, one on the second and one on the fourth segment, the latter usually only present on the underside of the body. In the larval stage it lives under the bark of the plum, wild and cultivated cherries, beach-plum, peach, Juneberry (*Amelanchier canadensis*), and chestnut. The eggs are laid on the trunk some distance from the ground and also on the branches. It also feeds in the black-knot fungus. The moths make their appearance during June and July.

Sesia albicornis (Hy. Edw.).

PLATE XXXI, FIG. 23, FEMALE; PLATE XXXIII, FIG. 15, MALE.

Egeria albicornis HY. EDWARDS, Papilio, Vol. I, 1881, p. 201; GROTE, New Check List N. Am. Moths, 1882, p. 12; RILEY, Proc. Ent. Soc. Wash. Vol. I, 1888, p. 85; BEUTENMÜLLER, Ann. N. Y. Acad. Sc. Vol. V, 1890, p. 205; Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 174; *ibid.* Vol. VI, 1894, p. 92.

Sesia albicornis SMITH, List Lepid. N. Am. 1891, p. 21; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 136; *ibid.* Vol. IX, 1897, p. 219.

Egeria proxima HY. EDWARDS, Papilio, Vol. I, 1881, p. 201; GROTE, New Check List N. Am. Moths, 1882, p. 12.

Sesia proxima SMITH, List Lepid. N. Am. 1891, p. 21.

Male.—Head bronzy black; palpi white, rarely pale yellow. Antennæ blue black, rarely with a white patch before the tip. Thorax bronzy black with a very slight, pale yellow stripe on each side, sometimes absent. Underside of thorax with a very pale yellow spot on each side. Abdomen

wholly bronzy black. Anal tuft marked with white beneath. Legs blue black; tibiæ with white tufts; anterior coxæ pure white. Fore wings transparent, with violet brown borders; costal and inner margins narrow; outer margin broad, golden yellow between the veins. Discal mark distinct, blue black. Underside scaled with pale yellow. Hind wings transparent with outer margin narrow, violet or blue black. Underside similar to the above.

Female.—Wholly bronzy black with violaceous reflections, except the transparent parts of the wings. The legs with bluish reflection and white tufts on the tibiæ. Fore wings beneath on the costal margin and discal marked with yellow scales. Antennæ always with a prominent white patch before the tip.

Expanse: Male, 15–18 mm; female, 18–22 mm.

Habitat.—New York, New Jersey, Pennsylvania, New Hampshire, Illinois, Colorado, California, Nevada, Oregon.

Type: One female. Coll Hy. Edwards, Am. Mus. Nat. Hist; *Ægeria proxima*, one female. Coll. F. Tepper, Agricul. College, Michigan.

Larva.—"Normal (*S. exitiosa*); clypeus high and narrow, the lower angles cut off, the lobes touching in a rather broad point; paraclypeal pieces rounded above, narrowed centrally. Brown, a light space about paraclypeal pieces, clypeal sutures and mouth brown, a black spot at the base of antennæ. Body white, annulets distinct, the second the larger; subventral folds slight. Shields faintly luteous, the cervical with brown curved lines. Tubercles nearly obsolete; setæ moderate. Abdominal crochets 10 to 14 in a row." (DYAR, MS)

A common species locally. The moths are found during May and early in June. In the larval stage it lives in the trunks and canes of young willows growing in swampy places. It also inhabits the burrows of *Cryptorhynchus lapathi* and the galls of *Saperda concolor*.

Sesia americana (Beuten.).

PLATE XXXII, FIG. 30, MALE.

Ægeria culiciformis BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 93.

Sesia culiciformis var. *americana* BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 136.

Sesia americana BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IX, 1897, p. 136.

Male.—Head deep blue black, orbits white; palpi black above, bright orange below. Thorax and abdomen metallic blue black, the former with an orange patch on each side beneath and the latter with the fourth segment red, sometimes with a red stripe on each side from the base to band on fourth segment. Anal tuft same color as the abdomen. Legs metallic blue black, tarsi tinged with sordid white. Fore wings transparent, opalescent, with blue black borders and discal mark. Underside pale orange at the base. Hind wings with margin narrow; discal mark slight.

Female.—Same as the male, but the abdomen is more robust and the antennæ are simple.

Expanse: Male and female, 21–25 mm.

Habitat.—Nevada, British Columbia, Washington.

Types: One male and three females. Coll. Am. Mus. Nat. Hist.

Closely allied to *S. culiciformis*, of which it may possibly be a climatic variety. It differs by having the fore wings blue black beneath, and by the absence of the pale bands on the legs.

In the larval stages it lives under the bark of alder and in the solid wood of the young stems (Plate XXXV, Fig. 2).

Sesia culiciformis (Linné).

Sphinx culiciformis LINNÉ, Syst. Nat. 10th Edit. 1758, p. 493; CLERCK. Icones Insect. Rarior. 1759, tab. ix, fig. 3.

Sesia culiciformis FABRICIUS, Syst. Ent. 1775, p. 549 (in part). HÜBNER, Tentamen, 1806 (?), p. 1 (restrict. sense).

Ægeria culiciformis STEPHENS, Brit. Ent. Haust. Vol. I, 1828, p. 143, pl. x, fig. 3.

Male.—Head and thorax blue black; palpi blue black above, orange beneath; thorax with an orange patch on each side beneath. Abdomen blue black with the fourth segment red above and below; anal tuft blue black. Legs blue black, tibiæ yellowish; hind femora with a yellowish band. Fore wings transparent with blue black margins and discal mark, orange basally. Underside washed with golden yellow. Hind wings transparent, with narrow, blue black margin; underside with costa golden yellow.

Female.—Similar to the male.

Expanse: Male and female, 21–28 mm.

Habitat.—Europe and Kodiak, Alaska.

Very much resembles *S. americana*, from which it differs by having the fore wings beneath entirely golden yellow and the hind tibiæ banded with yellowish brown. In Europe the species lives under the bark of white birch (*Betula alba*), plum, and apple. The moth appears in June.

Sesia tepperi (Hy. Edw.).

PLATE XXXII, FIG. 24, MALE.

Pyrrhotania tepperi HY. EDWARDS, Papilio, Vol. I, 1881, p. 203; GROTE, New Check List N. Am. Moths, 1882, p. 12.

Sesia tepperi BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 137.

Male.—Head orange on top, front blue, orbits white; palpi orange, antennæ black. Thorax above and below orange. Abdomen blue black above with the first and second segments and anal tuft orange; underside of abdomen wholly orange. Legs orange and blue. Fore wings narrow, metallic blue black with the transparent area small; underside orange at the base. Hind wings transparent, with the blue black outer margin broadest at the apex; discal mark small, black; underside orange at the base.

Expanse: 23 mm.

Habitat.—Georgia.

Type: One male. Coll. F. Tepper, Agricul. College, Michigan.

Only the unique type is known to exist in collections. It is a very distinct species and may be known by the narrow wings, orange thorax, and blue abdomen with the first two segments and anal tuft orange. Life-history not known.

Sesia acerni (Clemens).

PLATE XXXI, FIG. 24, FEMALE.

Trochilium acerni CLEMENS, Proc. Ac. Sc. Phil. 1860, p. 14; MORRIS, Synop. Lepid. N. Am. 1862, p. 330; Prairie Farm. 1869, p. 22.

Ægeria acerni RILEY, 6th Rep. Nox. Ins. Mo. 1874, p. 107; THOMAS, 1st Rep. Nox. Ins. Ill. 1876 (1878), p. 40; *ibid.* 2nd Rep. 1877 (1878), p. 173; EMILY SMITH, Shade Trees and In-

sects, 1877; KELLICOTT, Can. Ent. Vol. XIII, 1881, p. 7; *ibid.* Vol. XXIV, 1892, p. 46; Journ. Columbus Hort. Soc. 1890, p. 61; MARTIN, 5th Rep. Nox. Ins. Ill. (Thomas), 1880 (1881), p. 108; Prairie Farmer, Apr. 5, 1890; PACKARD, Ins. Inj. For. and Sh. Trees (Bull. No. 7, U. S. Ent. Com. 1881, p. 106); 5th Rep. U. S. Ent. Com. 1890, p. 384; BELL & REED, Can. Ent. Vol. XIII, 1881, p. 236; GROTE, New Check List N. Am. Moths, 1882, p. 12; SAUNDERS, Can. Ent. Vol. XIII, 1881, p. 69; *ibid.* Vol. XV, 1883, 187; Rep. Ent. Soc. Ont. 1881, p. 20; *ibid.* 1883 (1884), p. 12; RILEY, Am. Nat. Vol. VII, 1874, p. 123; *ibid.* Vol. XV, 1881, p. 751; REED, Can. Ent. Vol. XVI, 1884, p. 220; Rep. Ent. Soc. Ont. 1884 (1885), p. 24; HARRINGTON, Rep. Ent. Soc. Ont. 1887, p. 24; WEED, Am. Nat. Vol. XXIII, 1889, p. 1108, pl. 43, fig. 5; RILEY & HOWARD, Ins. Life, Vol. III, 1890, p. 161; WILEY, Insect Life, Vol. II, 1890, p. 251; BEUTENMÜLLER, Ann. N. Y. Acad. Sc. Vol. V, 1890, p. 205; LINTNER, Gardening, 1884, p. 56; OSBORN, Orange Judd Farm. 1890, p. 261; BRUNER, Rep. Neb. Hort. Soc. 1891, p. 151.

Sesia acerni HULST, Bull. Brooklyn Ent. Soc. Vol. VI, 1883, p. 10; SMITH, Cat. Ins. N. J. 1890, p. 289; LUGGER, Bull. 43, Agricul. Exp. St. Minn. 1895, p. 188, fig.; 1st. Rep. Ent. Agri. Exp. St. Minn. 1895 (1896), p. 92, fig.; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 138; *ibid.* Vol. IX, 1897, p. 220; BRUNER, Rep. Neb. Hort. Soc. 1894, p. 154.

Trochilium acericolum GERMADIUS, Am. Nat. Vol. VIII, 1874, p. 57.

Male.—Head, collar, and palpi orange, orbits white. Antennæ brown black. Thorax above and below yellow. Abdomen blue black more or less scaled with pale yellow, underside wholly yellow. Anal tuft bright orange. Legs pale yellow, tibiae with a black band at the end. Fore wings narrow, elongate, with narrow purplish borders more or less covered with pale yellow scales, outer part of wings pale yellow between the veins, with indications of a broken band. Discal mark large and deep black. Underside same as above. Hind wings transparent with the very narrow border and fringes purplish brown, sometimes yellow at the apex; underside similar to the upper, but with the costa marked with yellow.

Female.—Similar to the male. The margins of all the wings are darker in color and the hind wings want the yellow at the apex.

Expanse: Male and female, 22–25 mm.

Habitat.—Canada, New England and Middle States, westward to Nebraska.

Type: Lost.

Larva.—"Head rounded, the clypeus triangular, the paraclypeal pieces rounded above, constricted, shield-shaped; lobes somewhat broadly touching; pale testaceous, mouth between antennæ broadly black, sutures of clypeus brown; lower posterocellus with a slight lens. Body moderate, weakly annulate, the third annulet the highest; feet sessile, the crochets small, well developed, and normal, twelve to fourteen in a row. Somewhat flattened, subventral fold prominent. Whitish, the shield lines not evident; anal plate with a distinct tubercle each side tip and three other small ones, respectively subdorsal, lateral, and on the posterior rim within the large one. Spiracles small, brown-rimmed." (DYAR, MS.)

This is one of the most common species and is sometimes exceedingly destructive to different kinds of maples, especially the silver maple (*Acer dasycarpum*), the soft maple (*Acer rubrum*), and the sugar maple (*Acer saccharinum*). It also infests the mountain ash (*Pyrus americana*). The female deposits her eggs in the roughened parts of the trunks and branches or in wounded places. The larvæ feed upon the inner portions and sap wood, never penetrating into the solid wood. The excavations made by the larvæ are filled with its brown castings. When once established they keep at the scar or wound year after year, thus preventing recovery and

causing the trunks to become unsightly (Plate XXXVI, Fig. 2), in many cases killing young trees. When once the larvæ obtain an entrance into the tree it is very difficult to detect them, and they will then carry on their destructive work all through the summer and in early spring the following year. The moths emerge about the middle of May to about the middle of June. According to Mr. Hulst the eggs are probably laid at night. The moths emerge soon after sunrise and are on the wing a few minutes after emerging from the pupæ.

Sesia corni (Hy. Edw.).

PLATE XXXI, FIG. 17, FEMALE.

Egeria corni HY. EDWARDS, Papilio, Vol. I, 1881, p. 190; GROTE, New Check List N. Am. Moths, 1882, p. 173; KELLICOTT, Can. Ent. Vol. XXIV, 1892, pp. 46 and 210; Insect Life, Vol. V, 1892, p. 83; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 173.

Sesia corni SMITH, List Lepid. N. Am. 1891, p. 20; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 138; *ibid.* Vol. IX, 1897, p. 220.

Male.—Head black; palpi orange, orbits white; collar dull orange. Antennæ black. Thorax deep purplish black with a very narrow stripe on each side; pale orange beneath. Abdomen slender, deep purplish or blue black with a very narrow ring on the second and last three segments; underside pale yellow. Anal tuft black above, bright red beneath. Legs bluish or purplish black, tibiæ and tarsi banded with pale yellow; anterior coxæ yellow. Fore wings transparent with borders purplish or bluish black; inner margin very narrow; outer margin rather broad. Discal mark large, black. Underside same as above or washed with pale yellow. Hind wings transparent with very narrow margins. Discal mark small. Underside same as the upper.

Female.—Like the male, except the anal tuft, which is wholly red, and the antennæ have a large white patch on one side before the tip.

Expanse: Male and female, 18–21 mm.

Habitat.—Massachusetts, New York, Pennsylvania, Ohio.

Types: Two males. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Allied to *Sesia acerni*, but considerably darker, and lacking the yellow color on the wings and body. According to Kellicott it infests the branches of the maple. The larva lives in branches ranging from mere twigs to those an inch or two in diameter. These are often enlarged at several points into rough barked or gnarled excrescences. The swellings are often nearly globular, more often, however, oblong and frequently there are openings into the centre of the stems. Inside the branches are mined in various directions; this often causing them to die or become weakened. There may be one or more larvæ in a single excrescence. The moths issue from about the middle of May to the middle of July.

Sesia aureopurpurea (Hy. Edw.).

PLATE XXXII, FIG. 33, MALE; PLATE XXXIII, FIG. 7, FEMALE (?)

Egeria ? aureopurpurea HY. EDWARDS, Bull. Brooklyn Ent. Soc. Vol. III, 1880, p. 72.

Egeria aureopurpurea BEUTENMÜLLER, Bull. Mus. Nat. Hist. Vol. IV, 1892, p. 174.

Carmenta aureopurpurea GROTE, New Check List N. Am. Moths, 1882, p. 12.

Sesia aureopurpurea SMITH, List Lepid. N. Am. 1891, p. 20; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 137.

Male.—Head purplish brown, palpi yellow, tips black; collar narrowly edged with yellow. Antennæ black with a broad white band near the extremity. Thorax purplish brown with a narrow yellow stripe on each side. Abdomen purplish black with a yellow ring on second, third, fifth, and last segments. Anal tuft same color as abdomen. Legs purplish, tarsi yellowish; anterior coxæ yellow. Fore wings opaque, rich purplish brown, with a bright golden lustre; outer part with fine yellow streaks between the veins. Underside brighter than upper. Hind wings transparent, margin and fringes purplish brown. Discal mark small. Underside same as upper.

Expanse: 14 mm.

Habitat.—Texas.

Types: One male. Coll. Hy. Edwards, Am. Mus. Nat. Hist.; one male. Coll. Mus. Comp. Zoölogy, Cambridge, Mass.

This species may be readily known by its purplish brown, opaque fore wings and three narrow yellow bands on the abdomen. Its life-history is not known.

Sesia pyri (Harris).

PLATE XXXI, FIG. 16, FEMALE.

Egeria pyri HARRIS, New England Farmer, Vol. IX, 1830, p. 2; Am. Journ. Arts and Sciences, Vol. XXXVI, 1839, p. 313; Ins. Inj. Veget. 1841, p. 235; *ibid.* 2nd Ed. 1852, p. 256; *ibid.* 3rd Ed. 1862, p. 335; Harris's Corresp. (Scudder), 1869, p. 361; WALKER, Cat. Lepid. Brit. Mus. Pt. VIII, 1856, p. 45; PACKARD, Guide Study Insects, 1869, p. 278 (and other editions); THOMAS, 1st Rep. Nox. Ins. Illinois, 1876 (1878), p. 40; *ibid.* 2nd Rep. 1877 (1878), p. 170; STOUT, Rep. Kansas Hort. Soc. 1879 (1880), p. 88; MARTIN, Thomas's 5th Rep. Nox. Ins. Ill. 1880 (1881), p. 107; KELLCOTT, Can. Ent. Vol. XIII, 1881, p. 8; GROTE, Check List N. Am. Moths, 1882, p. 12; WEED, Am. Nat. Vol. XXIII, 1889, p. 1108, fig.; Ins. Life, Vol. IV, 1891, p. 34; SAUNDERS, Ins. Inj. to Fruit, 1883, p. 140, fig. 146; *ibid.* 2nd Ed. 1889, p. 140; RILEY, Proc. Ent. Soc. Wash. Vol. I, 1888, p. 85; BEUTENMÜLLER, Ann. N. Y. Acad. Sc. Vol. V, 1890, p. 204.

Trochilium pyri FITCH, 3rd Rep. Nox. Ins. N. Y. 1856, p. 349; MORRIS, Synop. Lepid. N. Am. 1862, p. 141.

Sesia pyri BOISDUVAL, Suites à Buffon, Nat. Hist. Lepid. Het. Vol. I, 1874, p. 440; SMITH, Cat. Ins. N. J. 1890, p. 289; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 139; *ibid.* Vol. IX, 1897, p. 220.

Egeria koebeli HY. EDWARDS, Papilio, Vol. I, 1881, p. 196; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 173.

Male.—Head black; palpi yellow beneath, black above; collar black above, white beneath. Thorax black with a yellow patch on each side beneath. Abdomen black with a narrow yellow ring on the second and fourth segments. Underside of abdomen washed with yellow along the middle. Anal tuft black. Legs blue black, yellow on one side, tibiæ and tarsi ringed with yellow; anterior coxæ yellow. Antennæ black, rarely with a white patch before the tips. Fore wings transparent, opalescent, borders purplish black; costal and inner margins narrow, outer margin broad, discal mark straight. Underside yellow along the costa and inner margin. Hind wings transparent, with very narrow purplish brown borders; discal mark absent.

Female.—Antennæ with a large clear white patch before the tip. Abdomen with the band on the fourth segment broader, covering the entire segment beneath. On the first and second segments

laterally is a yellow stripe. Anal tuft black yellow on each side above, and the outer part of the fore wings rayed with golden yellow between the veins. Otherwise same as the male.

Expanse : Male and female, 14-18 mm.

Habitat.—Canada to Florida and Texas.

Types : One male. Coll. T. W. Harris, Boston Soc. Nat. Hist. ; *Egeria koebelei*, one male. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Larva.—"Normal (*S. exitiosa*). Clypeus not distinctly truncate at lower corners, paraclypeal pieces narrowed centrally ; brown, yellowish about the paraclypeal sutures, the others and the mouth black, epistoma transparent. Body white, annulets moderate, shields very pale, cervical shield without any brown line in the groove. Feet with 6 to 8 small crochets." (DYAR, MS.)

A common species everywhere, infesting the apple and pear. The larva lives in the bark making small burrows. Unlike other members of the family, the larvæ do not live on the sap wood but immediately under and in the bark. (Plate XXXV, Fig. 3). The moth appears in June and early in July.

Sesia scitula (Harris).

PLATE XXXI, FIG. 25.

Egeria scitula HARRIS, Am. Journ. Arts and Sci. Vol. XXXVI, 1839, p. 313 ; WALKER, Cat. Lep. Brit. Mus. Pt. VIII, 1856, p. 45 ; GROTE, New Check List N. Am. Moths, 1882, p. 12 ; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 94.

Trochilium scitula HARRIS, Synop. Lepid. N. Am. 1862, p. 141.

Sesia scitula BOISDUVAL, Suites à Buffon, Nat. Hist. Lepid. Het. Vol. I, 1874, p. 439 ; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 139 ; *ibid.* Vol. IX, 1897, p. 200.

Trochilium gallivorum WESTWOOD, Gard. Chronic. 1854, p. 757 ; Trans. Ent. Soc. Lond. 2nd Ser. 1855, p. 21 ; HY. EDWARDS, Papilio, Vol. II, 1882, p. 97.

Egeria gallivora GROTE, New Check List N. Am. Moths, 1882, p. 12 ; KELLICOTT, Can. Ent. Vol. XXIV, p. 45.

Sesia gallivora SMITH, List Lepid. N. Am. 1897, p. 21.

Trochilium hospes WALSH, Proc. Ent. Soc. Phil. Vol. VI, 1866, p. 270.

Egeria hospes GROTE, New Check List N. Am. Lepid. 1882, p. 12.

Sesia hospes PACKARD, 5th Rep. U. S. Ent. Com. 1890, pp. 217, 328, 596.

Egeria æmula HY. EDWARDS, Papilio, Vol. III, 1883, p. 155 ; Ent. Amer. Vol. III, 1888, p. 224.

Sesia æmula SMITH, List Lepid. N. Am. 1891, p. 20.

Male.—Head and antennæ black ; palpi yellow, tip black ; orbits white. Thorax deep blue black with a yellow line on each side and a yellow patch on each side beneath. Abdomen deep blue black with a narrow yellow ring on the second and fourth segments, the latter covering the whole segment beneath. Anal tuft black. At the base of the abdomen is a yellow line reaching to the end of the second segment. Femora blue black, tibiæ yellow with a purple band on the middle and hind femora. Anterior coxæ yellow. Fore wings transparent, borders and discal mark blue black, narrow ; outer margin broad, with yellow rays. Underside brighter than the upper. Hind wings transparent, margins very narrow, blue black.

Female.—Similar to the male, but heavier. The palpi are wholly yellow and the fourth segment is yellow above and below ; the fifth and sixth are yellow beneath ; on the fore wings the yellow between the veins of the outer border is more distinct and the anal tuft is yellow at the sides.

Expanse : Male and female, 18-22 mm.

Habitat.—Canada, New England, and Middle States, to Virginia, westward to Ohio and Illinois.

Types : One female. Coll. T. W. Harris, Boston Soc. Nat. Hist. *Egeria æmula*, male and female. Coll. U. S. Nat. Mus.

Larva.—"Head normal, lobes meeting in a point, paraclypeal pieces narrowed centrally and rounded above, slight impressions centrally and toward apex; pale brown, dark about the mouth, epistoma colorless, a pale area above the paraclypeus, clypeal sutures dark. Body scarcely annulate, but the second annulet (tubercle ii) apparently the highest; subventral folds distinct; spiracles small, brown ringed. Crochets 12 to 15 in a row, distinct, normal though fine and small on account of the small size of the larva. Lower posterior ocellus pale, without pigment spot, but with a weak lens. White, a dark vascular dorsal line centrally; cervical shield membranous with brown curved lines at the corners. Joint 13 normal, divided into two segments, the posterior one small." (DYAR, MS.)

Closely allied to *Sesia pyri*, but the legs are largely yellow; the thorax has a yellow stripe on each side; the antennæ lack the white patch and the female has the fourth segment wholly yellow above and below. It lives in the larval stage under the bark of oak, chestnut, and dogwood, and it also inhabits the oak-gall (*Andricus cornigerus*). The dogwood (*Cornus florida*) seems to be one of the most favorite food plants. The larvæ live under the bark on the sap wood and produce burrows as shown on Plate XXXV, Fig. 5. The moth emerges in May and June. It is also said to live on hickory and willow.

Sesia ithacæ Beuten.

PLATE XXXI, FIG. 22, FEMALE.

Sesia ithacæ BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IX, 1897, p. 215.

Male.—Head black, palpi pale yellow beneath, black above and at the tip; collar narrowly yellow. Antennæ black. Thorax black with a pale yellow patch on each side beneath. Legs black, joints with pale dirty yellow rings; fore coxæ pale yellow. Abdomen and anal tuft black. Fore wings transparent, borders and discal mark black; basal area long; outer area small, subquadrate. Underside washed with yellow along the costa and inner margin. Hind wings transparent with narrow black margin above and below.

Female.—Black and yellow like the male, but the borders on the fore wings are considerably broader, thus reducing the transparent area of the wings. Underside with yellow rays between the veins on the outer part. Hind wings with margin also broader. Otherwise like the male.

Expanse : Male, 15 mm.; female, 18 mm.

Habitat.—New York (Ithaca).

Types : Male and female. Coll. Am. Mus. Nat. Hist.

Resembles *Sesia pyri*, but the margins of the wings and body are wholly black. Life-history unknown.

Sesia corusca (Hy. Edw.).

PLATE XXXI, FIG. 21, FEMALE.

Egeria corusca HY. EDWARDS, Papilio, Vol. I, 1881, p. 193; GROTE, New Check List N. Am. Moths, 1882, p. 12.

Sesia corusca SMITH, List Lepid. N. Am. 1891, p. 20; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 140.

Male.—Head metallic blue black, face yellow, palpi yellow. Thorax bronzy, with a yellow stripe on each side and a transverse mark at the posterior end. Abdomen bronzy, with a narrow band on the first, second, fourth, and last segments. Anal tuft bronzy. Legs bronzy outside, yellow inside. Anterior coxæ yellow. Fore wings transparent with discal mark and borders metallic golden bronze. Hind wings transparent, margin narrow, golden bronze. Underside of wings brighter than the upper.

Female.—Similar to the male.

Expanse: Male and female, 19–21 mm.

Habitat.—Texas.

Types: Two males. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

A small species, with metallic bronze margins on the fore wings, and four yellow bands on the abdomen. Nothing is known about its earlier stages.

Sesia decipiens (Hy. Edw.).

PLATE XXXI, FIG. 13, MALE, AND FIG. 5, FEMALE.

Ægeria decipiens HY. EDWARDS, Papilio, Vol. I, 1881, p. 197; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 367.

Sesia decipiens SMITH, List Lepid. N. Am. 1891, p. 20; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 141.

Ægeria imperfecta HY. EDWARDS, Papilio, Vol. I, 1881, p. 198; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 173.

Sesia imperfecta SMITH, List Lepid. N. Am. 1891, p. 20.

Ægeria nicotianæ HY. EDWARDS, Papilio, Vol. I, 1881, p. 202; GROTE, New Check List N. Am. Moths, 1882, p. 12.

Sesia nicotianæ SMITH, List Lepid. N. Am. 1891, p. 21.

Male.—Head black, orbits white, palpi bright yellow, black outside basally, collar yellow. Thorax black with a yellow transverse mark posteriorly; underside with a yellow patch on each side. Abdomen somewhat swollen at the middle, black with a yellow ring on the second, fourth, and last two segments, the one on the fourth twice as broad as the rest, and encircling the segment. Anal tuft hastate, black, tipped with yellow on each side above. Legs yellow and black, hind tibiæ yellow with a broad black band. Fore wings transparent, margins and veins blackish outer part rayed, with yellow between the veins. Discal mark bright red or yellow; underside with borders orange veins black. Hind wings transparent, the narrow margin and fringes bronzy brown; discal mark very small, orange or yellow; underside with margin orange.

Female.—Differs from the male by having the margin of the fore wings much broader; as a consequence the transparent areas are much reduced, especially the outer one. Abdomen with three bands, one on the second, fourth, and last segments, the middle one being the broadest. Anal tuft bunch-like. Antennæ simple.

Expanse: Male and female, 13–15 mm.

Habitat.—Colorado, Texas.

Types: One male; *Æ. imperfecta*, one female. Coll. Hy. Edwards, Am. Mus. Nat. Hist. *Æ. nicotianæ*, male and female. Coll. B. Neumoegen, Brooklyn Inst. Arts and Sciences.

A distinct species, easily known by its small size, the orange transverse mark on the fore wings, and by the yellow bands on the abdomen. The earlier stages are not known.

Sesia rubristigma (Kellicott).

PLATE XXXI, FIG. 11, MALE.

Ægeria rubristigma KELLICOTT, Can. Ent. Vol. XXIV, 1892, p. 211; Insect Life, Vol. V, 1892, p. 84; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 94.

Sesia rubristigma BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 141; *ibid.* Vol. IX, 1897, p. 220.

Male.—Head blue black, orbits pure white, palpi with basal joints black, second joint black except the tip, which is yellow, as is the whole of the third joint. Antennæ black. Collar yellow. Thorax black with a yellow mark posteriorly and a yellow patch on each side below. Abdomen black with a narrow yellow band on the second and last segments, and a broad one on the fourth segment encircling the body; first segment with a spot on each side. Anal tuft black with a narrow yellow line on each side. Legs blue black, varied as follows: anterior coxæ, fore tibiæ, all the tarsi, the spurs, and a band at the middle and apex of the hind tibiæ, yellow; the tarsi, however, have some dark scales, appearing faintly banded. Forewings transparent, purple black, borders very narrow. Discal mark square, bright red. Underside with borders yellow to the discal mark, which is the same as above. Hind wings transparent, borders very narrow, purplish, costa orange red; underside similar to the upper.

Female.—Similar to the male. The outer margin of fore wings much broader, with red scales between the veins. Anal tuft with a distinct yellow lateral line.

Expanse: Male and female, 16–18 mm.

Habitat.—Ohio, Iowa, New York.

Type: One male. Coll. Am. Mus. Nat. Hist.

Allied to the preceding species, from which it differs in having the margins of the fore wings black and much narrower, and the transverse mark brilliant red. The larva lives in the galls of *Andricus cornigerus*, on oak (*Quercus palustris*), and the moths appear in June and July.

Sesia querci (Hy. Edw.).

PLATE XXXI, FIG. 15, MALE.

Ægeria querci HY. EDWARDS, Papilio, Vol. II, 1882, p. 98.

Ægeria quercus HY. EDWARDS, Ent. Amer. Vol. III, 1888, p. 224; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 172.

Sesia querci PACKARD, 5th Rep. U. S. Ent. Com. 1890, p. 217; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 141; *ibid.* Vol. IX, 1897, p. 220.

Male.—Head black, palpi black, white inside and at the tip; collar yellow, antennæ black, clavate. Thorax black, patagia with a few yellow scales at the tip; posterior part with a small yellow spot; underside with a yellow patch on each side. Abdomen deep black with a very narrow yellow band on the second and third segments; a very broad one on the fourth extending around the body, and a very narrow one on each of the last two segments. Anal tuft black broadly edged with yellow above. Legs black, tufts and spurs white, anterior coxæ with a yellow line. Fore wings transparent with very narrow golden brown margin. Discal mark straight, narrow, pale yellow; underside of wings with margins and discal mark pale yellow. Hind wings transparent with very narrow purplish brown margin, costa pale yellow; underside same as the upper.

Female.—Larger than the male. Anal tuft black on each side, pale yellow in the middle. Otherwise similar to the male.

Expanse : Male, 12 mm. ; female 18 mm.

Habitat.—Arizona (Fort Grant).

Type : One male. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

One of the smallest species of the family. It is allied to *Sesia decipiens*, from which it differs in the number of bands on the abdomen and by the narrower and paler margins of the fore wings. It lives in a gall found on live-oak.

Sesia prosopis (Hy. Edw.).

PLATE XXXI, FIG. 6, MALE.

Ægeria prosopis HY. EDWARDS, Papilio, Vol. II, 1882, p. 99 ; Ent. Amer. Vol. III, 1888, p. 224 ; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 172.

Sesia prosopis SMITH, List Lepid. N. Am. 1891, p. 21 ; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 142 ; *ibid.* Vol. IX, 1897.

Male.—Head, antennæ, and thorax wholly deep black ; abdomen wholly black, or with a narrow white band on the second and last segments ; palpi white, third joint blackish. Legs black, hind tibiæ with tufts and spurs white ; hind tarsi banded with white ; anterior coxæ white. Fore wings transparent, borders and discal mark black, transparent area edged with whitish scales ; underside with costa and inner margin to the discal mark white. Hind wings transparent, with narrow black margin ; fringes white.

Expanse : 14 mm.

Habitat.—Arizona (Fort Grant).

Type : One male. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

A very distinct species, recognizable by the black color and white fringes on the hind wings. The female and earlier stages are not known. Lives in a gall found on mesquit.

Sesia tecta (Hy. Edw.).

PLATE XXXI, FIG. 7, MALE ; PLATE XXXIII, FIG. 2, MALE, AND FIG. 3, FEMALE.

Ægeria tecta HY. EDWARDS, Papilio, Vol. II, 1882, p. 56 ; GROTE, New Check List N. Am. Moths, 1882, p. 12.

Sesia tecta SMITH, List Lepid. N. Am. 1891, p. 21 ; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 142.

Male.—Head black, palpi yellow, collar very narrowly edged with yellow anteriorly. Antennæ black. Thorax black with a yellow line on each side and a small transverse mark of the same color posteriorly. Body black with five yellow bands, a narrow one on each of the first, second, and last two segments, and a very broad one on the fourth segment. The last three bands extend around the body, with an additional one on the fifth segment beneath. Anal tuft black, yellow in the middle beneath. Legs black, anterior coxæ yellow, femora black, tibiæ and tarsi with yellow rings. Fore wings with margins very narrow, black. Discal mark very narrow, straight and edged with orange outwardly. Underside marked with golden yellow. Hind wings transparent, with a very narrow black margin.

Expanse : 18 mm.

Habitat.—Arizona and New Jersey (?).

Types : Two males. Coll. B. Neumoegen, Brooklyn Inst. Arts and Sciences.

The margins of the fore wings and the transverse mark are very narrow, and the abdomen has fine yellow bands. The specimens from New Jersey may possibly be distinct from *S. tecta*. The early stages are not known.

***Sesia candescens* (Hy. Edw.).**

PLATE XXXI, FIG. 12, FEMALE.

Egeria candescens HY. EDWARDS, Papilio, Vol. II, 1882, p. 123; Ent. Am. Vol. III, 1888, p. 224; GROTE, New Check List N. Am. Moths, 1882, p. 12.

Sesia candescens SMITH, List Lepid. N. Am. 1891, p. 21; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 143.

Male.—Head blackish brown, collar, palpi, and orbits clear white; antennæ black. Thorax and abdomen blackish brown, the latter with all the segments rather broadly edged with white. Anal tuft black. Legs blackish brown, with golden scales, the tarsi narrowly banded with black; anterior coxæ white outwardly. Fore wings purplish brown, basal transparent space narrow; outer space very small, reduced to four narrow streaks; inner margin edged with whitish. Discal mark purplish brown, edged with orange red outwardly. Hind wings transparent, with a narrow purplish brown margin.

Expanse: 15 mm.

Habitat.—Arizona.

Type: One male. Coll. B. Neumoegen, Brooklyn Inst. Arts and Sciences.

A small, stout species, readily known by its black color and broad white bands on the abdomen. Only the type specimen is known.

***Sesia sigmoidea* (Hy. Edw.).**

PLATE XXXI, FIG. 20, FEMALE.

Egeria sigmoidea HY. EDWARDS, Papilio, Vol. II, 1882, p. 56; GROTE, New Check List N. Am. Moths, 1882, p. 12.

Sesia sigmoidea BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IX, 1897, pp. 214, 220.

Male.—Head and antennæ purple black, palpi yellow, black above; collar yellow. Thorax purple black with a yellow transverse mark posteriorly; underside with a yellow patch on each side. Abdomen blue or purple black, with a clear yellow band on the second, fourth, and last segments; the one on the fourth extending around the body. Anal tuft black, edged with white laterally. Legs blue black, hind tibiæ with a broad yellow band; tarsi partly yellow. Fore wings transparent, margins narrow, blue or purple black. Discal mark blue black, with an orange spot; underside washed with yellow. Hind wings transparent, margin very narrow, purple black above and below.

Female.—Similar to male, but the outer border of the fore wings is very broad, thus reducing the outer transparent area. Anal tuft black, with two yellow lines.

Expanse: Male and female, 18–21 mm.

Habitat.—New Hampshire, Massachusetts.

Types: Male and female. Coll. Am. Mus. Nat. Hist.

Said to be found on willow, but we have no definite knowledge of its breeding in this plant. The species is allied to the European *Sesia asiliformis*.

Sesia tacoma Beuten.

PLATE XXXII, FIG. 28, MALE, AND FIG. 29, FEMALE.

Sesia tacoma BEUTENMÜLLER, Journ. N. Y. Ent. Soc. Vol. VI, 1898, p. 240.

Male.—Head deep black, palpi yellow above and clothed with long black hairs beneath. Collar narrowly yellow in front. Thorax deep black, with a narrow yellow stripe on the patagia and a narrow yellow transverse mark at the posterior end; underside with a yellow patch on each side. Abdomen deep black, with a narrow yellow band at the end of the second, fourth, and last two segments, on the last three extending around the body. Anal tuft black, yellow in the middle beneath. Femora black; tibiæ black, banded with yellow at the middle; tarsi yellow; anterior coxæ with a yellow line. Fore wings transparent, borders rather broad, brown black, edged within with orange red. Discal mark prominent, edged with orange red. Transparent basal area triangular, outer one rounded. Underside with borders and discal mark almost entirely orange. Hind wings transparent, margin and fringes brown black; underside with an orange line before the dark margin, and the veins orange.

Female.—Head and thorax as in the male. Abdomen with three yellow bands, one on each of the second, fourth, and last segments. Palpi wholly yellow. Fore wings with very narrow brown black borders, and the orange red parts much broader than in the male, giving the wings a very red appearance. Underside with the orange very bright, the borders very narrow, and the fringes brown black; discal mark sometimes with a small black centre. Hind wings with the veins and narrow line before the brown black margin orange red; underside with bright orange red borders, fringes brown black.

Expanse: Male, 20–21 mm.; female, 20–22 mm.

Habitat.—Big Horn Mts., Wyoming. Mt. Ranier, 6300 feet, Washington.

Types: One male. Coll. U. S. Nat. Mus. Two males and four females. Coll. Am. Mus. Nat. Hist.

Allied to *Sesia chrysidiformis* of Europe. The palpi are clothed with long hairs, differing in this respect from all its congeners. In general appearance the insect looks somewhat like one of the varieties of *Albuna pyramidalis*, with which it may be confused at first sight.

Sesia texana (Hy. Edw.).

PLATE XXXI, FIG. 4, MALE.

Pyrrhotania texana HY. EDWARDS, Papilio, Vol. I, 1881, p. 204; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. V, 1893, p. 26; *ibid.* Vol. VIII, 1896, p. 145.

Pyrrhotania wittfeldii HY. EDWARDS, Papilio, Vol. III, 1883, p. 156; Ent. Amer. Vol. III, 1888, p. 224; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 175.

Male.—Head brown black, palpi and collar orange, antennæ black, ferruginous beneath. Thorax black with a narrow orange stripe on each side, and a transverse orange mark posteriorly. Abdomen brown black with an orange ring on the second, fourth, and last two segments, the last three rings extending around the body, fifth segment orange beneath. Anal tuft brown black, orange on each side beneath. Legs blue black, spurs and tufts orange. Fore wings with very small transparent areas, the outer one sometimes covered with orange scales, borders and discal mark blue or purple black. Underside with the costa and inner margin orange. Hind wings transparent with very narrow blue or purple black margin, above and below.

Female.—Similar to the male, but the fore wings are usually a little more opaque or entirely so, lacking the orange on the outer part of the wing. Abdomen with three orange bands, one on the second, fourth, and last segments. Anal tuft wholly black.

Expanse : Male and female, 18–22 mm.

Habitat.—Florida, Texas.

Types : Two males. Coll. B. Neumoegen, Brooklyn Inst. Arts and Sciences ; *Pyrrhotenia wittfeldii*, one male, and two females. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

May be readily known by the almost opaque fore wings and the orange bands on the abdomen. Life-history not known.

Sesia seminole Beuten.

PLATE XXXIII, FIG. 18, MALE, AND FIG. 20, FEMALE.

Sesia seminole BEUTENMÜLLER, Journ. N. Y. Ent. Soc. Vol. VII, 1899, p. 255.

Male.—Head and antennæ brown black ; palpi and collar in front pale orange. Thorax brown black, with a narrow orange line on the patagia and a transverse line of the same color posteriorly. Abdomen brown black, with a somewhat metallic reflection in certain light ; at the posterior end of the second, fourth, and last segments is a narrow orange yellow band. Anal tuft black, slightly orange at the middle beneath. Middle and hind femora blackish, tibiæ violet, with an orange band at the middle. Tarsi orange inside, violaceous outside. Fore wings narrow, transparent area present but not characteristic ; costal margin brown black, outer part of wing with the veins heavily marked with brown black, with narrow rays of orange between, fringes brown black ; inner margin scaled with orange ; transverse mark conspicuous, orange red, transparent space beyond small and round. Hind wings transparent, a small orange mark at upper end of cell, margin and fringes violaceous. Under side of fore wings washed with golden orange.

Female.—Similar to the male in color and markings of body and legs. Fore wings broader with the outer margin less oblique. Basal transparent area filled with orange, broken by the dark median vein ; outer transparent area filled with orange between the dark veins. The dark parts of the wings have a decided violet reflection, much more so than in the male. Transverse mark orange, marked with black at the inner part. The margin of the hind wing is also violet.

Expanse : Male, 17 mm. ; female, 15–18 mm.

Habitat.—Lake Worth, Florida.

Types : One male and two females. Coll. Am. Mus. Nat. Hist. ; one female. Coll. Mrs. A. T. Slosson.

A small species with orange bands on the abdomen, somewhat resembling *Sesia marica*, which is a much larger and broader-winged species. The moths appear in February.

Sesia marica Beuten.

PLATE XXXIII, FIG. 8, MALE.

Sesia marica BEUTENMÜLLER, Journ. N. Y. Ent. Soc. Vol. VII, 1899, p. 254.

Male.—Head black, palpi bright orange ; collar black, edged in front with orange. Antennæ black. Thorax black, with a conspicuous orange stripe on each side, on the patagia, meeting a transverse band on the posterior edge. Thorax black beneath with a large orange patch on each

side. Abdomen brown black, with an orange band on the posterior edge of the second, fourth, sixth, and seventh segments. Middle and hind femora brown black; tibia and tarsi orange, the former with a black band near the end; anterior coxæ and femora brown black inside, orange outside. Anal tuft black above, orange beneath. Fore wings transparent, costal margin black, fringes brown; inner margin orange. Basal transparent area long, with the median vein black, continued as a violet streak to the hind angle. Transverse mark orange red. Outer transverse area rather large, rounded, veins black, orange between them at the outer part of wing. Hind wings with the costa narrowly orange, outer margin very narrowly brown black, fringes concolorous. Fore wings beneath washed with golden orange along the costa and inner margin to the transverse mark, otherwise similar to the upper. Hind wings beneath, same as above.

Female.—Similar to the male in color and markings of the body, but the fore wings are more opaque, and the transparent spaces are much reduced.

Expanse: Male and female, 25 mm.

Habitat.—Florida.

Type: One male. Coll. Am. Mus. Nat. Hist.

A very distinct species with two very broad stripes and a transverse posterior mark on the thorax. The abdomen is banded with orange and the outer margins of the fore wings are marked with golden orange.

Sesia præstans (Hy. Edw.).

PLATE XXXII, FIG. 27, MALE.

Egeria præstans HY. EDWARDS, Papilio, Vol. II, 1882, p. 98; Ent. Amer. Vol. III, 1888, p. 224.

Sesia præstans SMITH, List Lepid. N. Am. 1891, p. 20.

Pyrrhotenia præstans BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 144; *ibid.* Vol. IX, 1897, p. 216.

Male.—Head black with an orange tuft on the crown; palpi bright orange; face with a metallic blue reflection. Thorax bronze black with an orange stripe on each side. Beneath the thorax has an orange patch on each side. Femora bronze black, tibiæ deep orange, the posterior pair brightest in color; tarsi buff yellow. Abdomen bronze black above with the fourth segment coppery red and a narrow band of the same color on the last two segments. Anal tuft coppery red, sides bronze. Fore wings with margins and discal mark bright bronze. The transparent spaces broadly edged with bright fiery red and also along the inner margin; outer part of wings fiery red between the veins. Hind wings transparent, costa, internal margin, and patch at base of wings bright red; outer margin bronze. On the underside of wings the markings are repeated but the red shade is more orange, and is diffused over the whole opaque portions of the wings.

Female.—Similar to the male but the transparent spaces of the fore wings are filled with orange red, and the margins and veins of the hind wings are of the same color. Otherwise like the male.

Expanse: Male and female, 23 mm.

Habitat.—Washington.

Type: One male. Coll. B. Neumoegen, Brooklyn Inst. Arts and Sciences.

A well-marked species, readily known by its orange color. Earlier stages not known.

Sesia fragariæ (Hy. Edw.).

PLATE XXXII, FIG. 5, MALE, AND FIG. 6, FEMALE.

Pyrrhotenia fragariæ HY. EDWARDS, Papilio, Vol. I, 1881, p. 202; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 174; *ibid.* Vol. V, 1893, p. 26; Vol. VI, 1894, p. 55; Vol. VIII, 1896, p. 431.

Pyrrhotenia orthocarpi HY. EDWARDS, Papilio, Vol. I, 1881, p. 204; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 174.

Male.—Head black with a metallic blue reflection; palpi red, slightly black outside. Antennæ blue black. Collar red in front. Thorax metallic bronze, patagia tipped with red posteriorly. Abdomen bronze with the fourth and last segments red above, sides of abdomen edged with red. Anal tuft red, blue black on each side above. Femora bronze; tibiæ red, bronze at each end; tarsi bronze, slightly red on one side. Fore wings with margins and discal marks broad, metallic green, and transparent spaces very small; inner margin bright red to about the middle of the wing. Underside same as above, but the costa and inner margins are red to the discal mark. Hind wings transparent, red along inner margin; outer margin bronzy brown.

Female.—Fore wings opaque, metallic green or blue, inner margin orange red, sometimes a minute transparent streak in the cell and two or three between the veins beyond the discal mark. Hind wings opaque or partly so, orange red. Anal tuft wholly orange red. Otherwise similar to the male.

Expanse: Male, 18 mm.; female, 15–22 mm.

Habitat.—Nevada, Utah, Colorado.

Types: One female; *P. orthocarpi*, three males. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Nothing is known about the life-history of this species.

Sesia behrensii (Hy. Edw.).

PLATE XXXII, FIG. 1, FEMALE, AND FIG. 2, MALE.

Pyrrhotenia behrensii HY. EDWARDS, Papilio, Vol. II, 1882, p. 123; Ent. Amer. Vol. III, 1888, p. 224; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 174; *ibid.* Vol. V, 1892, p. 26; Vol. VIII, 1896, p. 143.

Pyrrhotenia elda HY. EDWARDS, Ent. Amer. Vol. I, 1885, p. 49; *ibid.* Vol. III, 1888, p. 224, BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 175.

Pyrrhotenia helianthi HY. EDWARDS, Papilio, Vol. I, 1881, p. 202; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 95.

Male.—Head black, face with a violet lustre, palpi and collar orange. Antennæ black. Thorax metallic blue or green black with a red stripe on the patagia and a patch of the same color on the underside. Legs red; femora black; tarsi marked with black. Abdomen metallic green or blue with the last four segments red and a stripe of the same color along the sides of the first three segments. Underside banded with red. Anal tuft red, blue or green black laterally. Fore wings opaque, metallic blue or green black with a red stripe along the inner margin; underside dull brown black, red along the costa, inner margin, and basally. Hind wings transparent, outer margin violet brown, inner margin and base red.

Female.—Differs from the male by the following characters: Head with a bunch of red hairs on the crown. Abdomen with the last three segments above, all the segments beneath, and the anal tuft red. Hind wings opaque, bright scarlet red, with outer margin and fringes brown.

Expanse: Male and female, 18–22 mm.

Habitat.—California.

Types: Three males; *P. elda*, two females; *P. helianthi*, one female. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Sesia mariona, sp. nov.

PLATE XXXIII, FIG. 21, FEMALE.

Female.—Head white, vertex pinkish; collar pale pinkish above, white beneath; palpi white. Antennæ black, with a greenish lustre. Thorax green black with a very large bright red patch on each side in front, contiguous with the bright red line on each side above. Abdomen and anal tuft wholly metallic green black. Legs metallic green black, anterior coxæ white. Fore wings metallic green black with a broad, bright red line along the inner margin; extreme edge of costa pale testaceous or dirty white. Hind wings brown with a violaceous lustre, central part with two transparent areas, the upper one broken by the discal mark. Underside of wings brown with a decided violaceous lustre, costal margins pale testaceous.

Expanse: 17–20 mm.

Habitat.—Trimble and Pagossa Springs, and Durango, Colorado, July 6th, 19th and 30th, 1899.

Type: Two females. Coll. Dr. William Barnes, Decatur, Illinois. One female. Coll. Am. Mus. Nat. Hist.

Described from three females. The male and earlier stages of the species are unknown.

Sesia polygoni (*Hy. Edw.*).

PLATE XXXII, FIG. 8, FEMALE, AND FIG. 9, MALE.

Pyrrhotænia polygoni HY. EDWARDS, Papilio, Vol. I, 1881, p. 202; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 174; *ibid.* Vol. VI, 1894, p. 95; Vol. VIII, 1896, p. 144.

Pyrrhotænia meadii HY. EDWARDS, Papilio, Vol. I, 1881, p. 204; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 174.

Male.—Head and collar black; palpi bright scarlet red, black outside. Thorax black with a bluish lustre, patagia tipped with red posteriorly. Underside with a red patch on each side. Legs black, middle and hind tibiæ each with a broad scarlet band. Abdomen black with a bluish lustre, fourth and last two segments, and lateral stripe scarlet red. Anal tuft scarlet red with a blue black stripe laterally. Fore wings bright metallic blue black with a scarlet stripe along the inner margin, fringes brown; underside orange basally. Hind wings transparent, margin violaceous, red basally on the inner margin, fringes brown. Underside same as the upper.

Female.—Somewhat like the male, but the hind wings are bright scarlet red with the outer border broadly brown black with a violaceous lustre. Abdomen with the fourth and last segments scarlet red; lateral red line also present.

Expanse: Male and female, 18–20 mm.

Habitat.—California.

Types: One female; *P. meadii*, two males. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Sesia achillæ (*Hy. Edw.*).

PLATE XXXII, FIG. 10, MALE.

Pyrrhotænia achillæ HY. EDWARDS, Papilio, Vol. I, 1881, p. 203; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 174; *ibid.* Vol. VIII, 1896, p. 144.

Pyrrhotænia eremocarpi HY. EDWARDS, Papilio, Vol. I, 1881, p. 203; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 174.

Male. — Head, collar, and antennæ black; palpi black, red basally beneath. Thorax metallic blue black with the patagia tipped with red posteriorly and a red patch on each side beneath. Abdomen wholly metallic blue black above and below. Anal tuft red, blue black on each side above. Legs wholly blue black. Fore wings bright metallic blue or green black with a red streak on the inner margin basally. Underside same as the upper. Hind wings transparent, with a blue black border.

Expanse: 15–18 mm.

Habitat. — California.

Types: One male; *P. eremocarpi*, one male. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Sesia floridensis (Grote).

PLATE XXXII, FIG. 11, MALE.

Pyrrhotenia floridensis GROTE, Can. Ent. Vol. VII, 1875, p. 174; New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 175; *ibid.* Vol. VIII, 1896, p. 145; *ibid.* Vol. IX, 1897, p. 220.

Male. — Head and antennæ black; palpi black at the base, red towards the tip. Collar red. Thorax blue black with a prominent red transverse mark posteriorly, and a red patch on each side below. Abdomen blue black with the fourth segment above and below bright red, and a red band on each of the last two segments above. Anal tuft black, very narrowly edged with white laterally. Legs black, tarsi red, hind tibiæ red with a black band; anterior coxæ with a red stripe. Fore wings metallic purple black with a short transparent basal streak, cell and a few outer rays and inner margin basally bright red. Underside red, veins purplish. Hind wings transparent bordered with violet brown. Underside with border red, fringes brown.

Expanse: 14–18 mm.

Habitat. — Florida.

Type: One male. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Sesia geliformis (Walker).

PLATE XXXII, FIG. 4, FEMALE.

Ægeria geliformis WALKER, Cat. Lepid. Brit. Mus. Pt. VIII, 1856, p. 46; HY. EDWARDS, Papilio, Vol. I, 1881, p. 208; DRUCE, Biol. Cent.-Amer. Vol. I, Het. 1883, p. 32, pl. v., figs. 12 and 17.

Trochilium geliformis MORRIS, Synop. Lepid. N. Am. 1862, p. 333.

Sesia geliformis BOISDUVAL, Suites à Buffon, Nat. Hist. Lepid. Het. Vol. I, 1874, p. 441.

Pyrrhotenia geliformis GROTE, New Check List N. Am. Moths, 1882, p. 12; HY. EDWARDS, Papilio, Vol. III, 1883, p. 157; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 145.

Sciapteron geliformis HAMPSON, Ann. Mag. Nat. Hist. Vol. XVI, 1895, p. 349.

Male. — Head, thorax, palpi, antennæ, and legs wholly black with a greenish lustre. Abdomen above and below bright red, except the first segment which is blue black. Anal tuft red, marked with black laterally. Fore wings opaque, wholly blue black above and below. Hind wings transparent, margin rather broad, brown black.

Female. — Same as the male but larger and more robust.

Expanse: Male, about 10 mm.; female, 15–19 mm.

Habitat. — Florida, St. Vincent, Br. West Indies, and Mexico.

Type: One male. Coll. British Museum.

Sesia sapygæformis (Walker).

PLATE XXXII, FIG. 7, MALE.

Egeria sapygæformis WALKER, Cat. Lepid. Brit. Mus. Pt. VIII, 1856, p. 45; HY. EDWARDS, Papilio, Vol. I, 1881, p. 207.

Trochilium sapygæformis MORRIS, Synop. Lepid. N. Am. 1862, p. 333.

Sesia sapygæformis BOISDUVAL, Suites à Buffon, Nat. Hist. Lepid. Het. I, 1874, p. 440.

Pyrrhotænia sapygæformis GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 146.

Male.—Head and antennæ black, palpi red, black outside, basally; collar red. Thorax black with a red transverse mark posteriorly and a red patch on each side beneath. Abdomen with the first three segments black, remaining ones bright red above and below. Anal tuft black. Legs red and black; tibiæ with broad red band. Fore wings blue black, purplish outwardly, with a red streak basally beneath which there is a transparent streak. Underside red to about the middle of the wing, outwardly same as the upper. Hind wings transparent, outer margin violet black, rather broad at the apex. Underside same as upper.

Female.—Same as the male in color and marking, but has only the three last segments red instead of four as in the male.

Expanse: Male and female, 17–19 mm.

Habitat.—Florida.

Type: One male. Coll. British Museum.

Sesia animosa (Hy. Edw.).

PLATE XXXI, FIG. 29, MALE, AND FIG. 30, FEMALE.

Pyrrhotænia animosa HY. EDWARDS, Papilio, Vol. III, 1883, p. 156; Ent. Am. Vol. III, 1888, p. 224; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 175; *ibid.* Vol. VIII, 1896, p. 146.

Male.—Head and antennæ blue black, palpi red, tip black; sometimes mixed with black hairs. Abdomen bronzy black, patagia tipped with red behind and a spot of the same color on each side beneath. Abdomen bronzy black, last segment red and the three preceding segments red laterally. Anal tuft red, black on each side. Legs green black. Fore wings metallic green black with a red streak on the inner margin. Underside same as the upper. Hind wings transparent, margin brown black. Underside same as the upper.

Female.—Head, thorax, legs, and fore wings same as in the male. Hind wings opaque, bright metallic green or blue above and below. Abdomen with the last three segments red at the sides; the last segment wanting the red above. Anal tuft wholly black.

Expanse: Male and female, 16–20 mm.

Habitat.—Arizona.

Type: Male and female. Coll. B. Neumoegen, Brooklyn Inst. Arts and Sciences.

Sesia pyralidiformis (Walker).

PLATE XXXII, FIG. 18, FEMALE.

Egeria pyralidiformis WALKER, Cat. Lepid. Brit. Mus. Pt. VIII, 1856, p. 44; HY. EDWARDS, Papilio, Vol. I, 1881, p. 207.

Trochilium pyralidiformis MORRIS, Synop. Lepid. N. Am. 1862, p. 333.

Sesia pyralidiformis BOISDUVAL, Suites à Buffon, Nat. Hist. Lepid. Het. I, 1874, p. 439.

Carmenta pyralidiformis HY. EDWARDS, Papilio, Vol. I, 1881, p. 184; GROTE, New Check List N. Am. Moths, 1881, p. 12; KELLCOTT, Can. Ent. Vol. XXIV, 1892, p. 46; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 175; *ibid.* Vol. VIII, 1896, p. 147.
Sesia nigella HULST, Bull. Brooklyn Ent. Soc. Vol. III, 1881, p. 75; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 175.

Male.—Head purplish, palpi and collar yellow. Thorax purplish black with a very narrow stripe on each side and a yellow mark on each side beneath. Abdomen purplish black, with the fourth segment above yellow, and a yellow ring at the end of the last segment. Anal tuft purplish brown, slightly tipped with yellow on each side. Legs purplish, hind tibiæ with a yellow mark; tarsi pale on one side. Fore wings opaque, shining purple brown, underside marked with yellow basally. Hind wings transparent, with narrow purple brown margin.

Female.—Same as the male, but the yellow band on the last segment is wanting and the anal tuft is straight, brush-like.

Expanse: Male, 14–17 mm.; female, 15–20 mm.

Habitat.—Canada to Texas.

Type: Female. Coll. British Museum; *S. nigella*, one male. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Sesia sanborni (Hy. Edw.).

PLATE XXXII, FIG 17, FEMALE.

Carmenta sanborni HY. EDWARDS, Papilio, Vol. I, 1881, p. 185; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 175; *ibid.* Vol. VIII, 1896, p. 147.

Female.—Head dull brown; palpi white with the third joint black. Thorax and abdomen rather dull bronze brown, the latter with a narrow, pale yellow band on the upper side of the second and fourth segments. Anal tuft slight. Legs bronze brown. Fore wings rather dull bronze brown, opaque, outer part with a small white spot. Underside streaked with pale yellow basally. Hind wings transparent, margin and fringes violet brown.

Expanse: 19 mm.

Habitat.—Massachusetts.

Type: One female. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Sesia ruficornis (Hy. Edw.).

PLATE XXXII, FIG. 35, FEMALE.

Carmenta ruficornis HY. EDWARDS, Papilio, Vol. I, 1881, p. 184; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 147.
Carmenta minuta HY. EDWARDS, Papilio, Vol. I, 1881, p. 185; GROTE, New Check List N. Am. Moths, 1882, p. 12.

Male.—Head and thorax violaceous, palpi yellow, collar edged with yellow anteriorly, patagia yellow posteriorly. Antennæ violaceous rufous beneath. Abdomen violaceous, with a narrow, yellow band on the second, fourth, and last segments. Anal tuft straight, brush-like. Legs violaceous, with yellow bands. Fore wings opaque, violaceous, with a slight trace of red in the cell and outer part. Underside similar to the above. Hind wings transparent, margin and veins violaceous.

Female.—Larger and more robust than the male. The red on the fore wings is more pronounced and a short basal streak of the same color.

Expanse : Male, 10 mm. ; female, 14 mm.

Habitat.—Georgia, Alabama (Southern States).

Type : One female. Coll. E. Graef, Brooklyn Inst. Arts and Sciences. *C. minuta*, one male. Coll. F. Tepper, Agricul. College Michigan.

Sesia subærea (Hy. Edw.).

PLATE XXXII, FIG. 3, MALE.

Pyrrhotænia subærea HY. EDWARDS, Papilio, Vol. III, 1883, p. 156 ; Ent. Amer. Vol. III, 1888, p. 224 ; Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 146.

Male.—Head and thorax deep brown, the latter with a yellow mark posteriorly. Antennæ with a pale yellow band before the tip ; palpi yellowish. Abdomen brownish, with yellow scales and traces of bands on the fourth, fifth, sixth, and seventh segments. Anal tuft mixed with yellow. Fore wings purplish brown sprinkled with yellow scales. Hind wings purplish brown, transparent at the base. All wings sprinkled with yellow beneath.

Expanse : 14 mm.

Habitat.—Arizona.

Type : One male. Coll. B. Neumoegen, Brooklyn Inst. Arts and Sciences.

Sesia nigra (Beuten.).

PLATE XXXII, FIG. 19, FEMALE.

Carmenta nigra BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 95 ; *ibid.* Vol. VIII, 1896, p. 147.

Female.—Head black on top, face dirty white, palpi white, marked with black outside ; collar dirty white in front. Antennæ black. Thorax black, patagia slightly tipped with white. Abdomen black with a white band at the posterior part of the second, fourth, and last segments, the one on the fourth broadest and extending around the body. Anal tuft slight, black. Legs black ; anterior coxæ marked with white and the hind tibiæ with a white band on one side. Fore wings opaque, black, with a white streak in the cell and a few white streaks between the veins on the outer part of wings. Underside yellowish along the costa. Hind wings opaque, black, slightly transparent basally.

Expanse : 14 mm.

Habitat.—Colorado, Utah.

Type : One female. Coll. Am. Mus. Nat. Hist.

Sesia verecunda (Hy. Edw.).

PLATE XXXII, FIG. 26, FEMALE.

Egeria verecunda HY. EDWARDS, Papilio, Vol. I, 1881, p. 190 ; GROTE, New Check List N. Am. Moths, 1882, p. 12 ; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 173. *Sesia verecunda* BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. VIII, 1896, p. 142.

Female.—Head on top, with dirty yellowish hairs, face white, collar white, antennæ black, yellowish beneath, palpi white. Thorax black, with a dirty yellow line on each side and a white patch

on each side beneath. Abdomen black with a dirty white band on the fourth and last segments. Legs black, femora marked with a little white. Fore wings opaque, brown, streaked with white along the inner margin, in the cell and between the veins on the outer part. Underside similar. Hind wings brown above and below.

Expanse : 19 mm.

Habitat.—Colorado.

Types : Two females. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

One of the most aberrant species of the genus as far as coloration is concerned. The wings are dull brown streaked with sordid white. The male is not known.

Sesia edwardsii (Beuten.).

PLATE XXXII, FIG. 16, FEMALE.

Egeria edwardsii BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VI, 1894, p. 92.

Sesia edwardsii BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 142.

Female.—Head black, face white, palpi white with a black stripe outside. Antennæ black. Thorax black with a very narrow line on each side. Abdomen black with a dirty yellow band on the second and last segments, both extending around the body; fourth segment dirty yellow above and below; fifth segment with a dirty yellow band beneath. Anal tuft black, with a yellow line on each side above. Femora black, middle and hind tibiæ yellow with a black band at the end; tarsi yellow and black; anterior coxæ white. Fore wings opaque dull violet, brown black with a few yellow streaks in the cell and beyond the discal mark. Underside similar to the above, but the yellow is more pronounced. Hind wings dull orange, with the veins, discal mark, and borders violet; between veins r^a and 2 is a transparent brown streak; underside much brighter than upper.

Expanse : 24 mm.

Habitat.—Colorado.

Type : One female. Coll. Am. Mus. Nat. Hist.

A distinct species with violet brown fore wings, dull orange hind wings, and three yellow bands on the abdomen. The male and early stages are not known.

Calasesia Beuten.

FIG. 23.

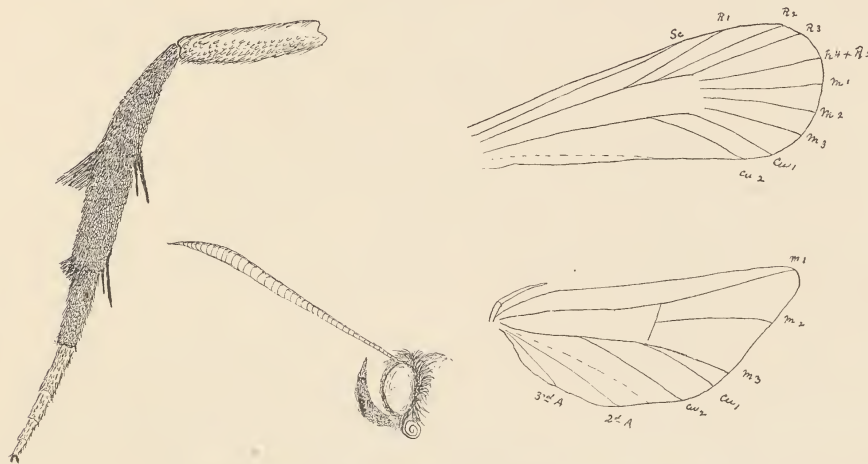


Fig. 23. Hind Leg, Head, and Venation of *Calasesia coccinea*.

Calasesia BEUTENMÜLLER, Journ. N. Y. Ent. Soc. Vol. VII, 1899, p. 256.

Palpi upturned, with appressed scales, reaching the top of the head; third joint long, slender. Antennæ thickened at apical half to a slender club. Legs scaled; hind legs with small tufts at the spurs of the tibiæ above; no tarsal tufts. Body tapering to a point; anal tuft slight, straight. Fore wings with 10 veins; Cu_2-R_1 from cell; R_4 and R_5 coalescing; Sc from base. Hind wings with vein Cu_2 from cell; M_3 and Cu_1 from end of cell; M_2 from middle; Sc and R absent.

Type: *Pyrrhotænia coccinea* Beuten.

Calasesia coccinea (Beuten.).

PLATE XXXII, FIG. 20, FEMALE.

Pyrrhotænia coccinea BEUTENMÜLLER, Journ. N. Y. Ent. Soc. Vol. VI, 1898, p. 241; *ibid.* Vol. VII, 1899, p. 256.

Female.—Head black, palpi yellow, tip black; collar narrowly edged with white in front. Thorax and abdomen bronzy black with a metallic reflection. Antennæ brown black. Underside of thorax with a scarlet patch on each side. Legs metallic blue black. Fore wings with a bright scarlet red outer border and a round bronzy brown spot at the end of the cell. Hind wings brown. Under-side of fore wings light orange, outer part brown, discal mark much reduced. Hind wings beneath same as above.

Expanse: 12 mm.

Habitat.—New Mexico.

Type: One female. Coll. U. S. Nat. Mus.

One of the most aberrant species of the family. The fore wings are bright scarlet red with a prominent bronzy brown discal spot. The male and early stages are not known.

Paranthrene Hübner.

FIG. 24.

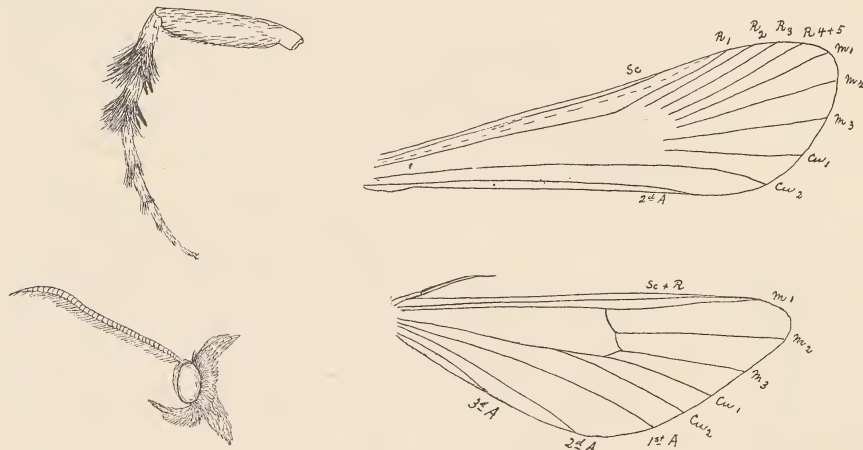


Fig. 24. Hind Leg, Head, and Venation of *Paranthrene heuchera*.

Paranthrene HÜBNER, Verz. bek. Schmett. 1816, p. 128; HERRICK-SCHAEFFER, Schmett. Europa, Vol. II, 1846, p. 58; STAUDINGER, Ent. Zeit. Stettin, Vol. XVII, 1856, p. 334.

Zenodoxus GROTE & ROBINSON, Trans. Am. Ent. Soc. Vol. II, 1868, p. 184.

Palpi straight, somewhat hairy. Body tapering, anal tuft straight, slight. Legs rather short with prominent tufts on the tibiæ. Antennæ plumose in the male, simple and thread-like in the female. Tongue absent. Fore wings with 11 veins; costa folded downward; R_4 and R_5 coalescing. Hind wings with vein Cu_1 from near M_3 before end of cell. $Sc + R$.

Since writing the historic review of the generic names of the Sesiidæ (*antea*, p. 223) I find after careful examination that *Zenodoxus* does not differ materially from *Paranthrene* of Europe.

SYNOPSIS OF SPECIES.

Wings brown, streaked with bright red.

Abdomen banded with bright orange yellow.....*palmii*

Wings brown, rarely marked with red.

Abdomen with a pale yellow band on the first and fourth segments.....*maculipes*

Abdomen with the last four segments banded with yellow.....*heucherae*

Wings black, marked with white.

Abdomen banded with white.....*mexicanus*

Wings gray, concolorous. Hind wings partly transparent.

Abdomen gray.....*canescens*

Paranthrene maculipes (G. & R.).

Zenodoxus maculipes GROTE & ROBINSON, Trans. Am. Ent. Soc. Vol. II, 1868, p. 184; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 175; *ibid.* Vol. VIII, 1896, p. 148.

Male.—Head bronzy brown; palpi pale dirty yellow. Thorax bronzy brown above and below. Abdomen purplish brown with a pale yellow band on each of the first and fourth segments. Legs brown, marked with dirty yellow. Fore wings bronzy brown with a few reddish scales. Hind wings bronzy brown, with the tips of the fringes somewhat paler. Underside of wings similar to the upper.

Female.—Similar to the male.

Expanse: Male and female, 18–24 mm.

Habitat.—Texas.

Types: One male. Coll. Am. Mus. Nat. Hist.; one female. Coll. Mus. Comp. Zoöl., Cambridge, Mass.

May be readily known by the brown wings and two yellow bands on the abdomen. Nothing is known about its life history.

Paranthrene heucherae (Hy. Edw.).

PLATE XXXII, FIG. 14, MALE.

Zenodoxus heucherae HY. EDWARDS, Papilio, Vol. I, 1881, p. 205; GROTE, New Check List N. Am. Moths, 1882, p. 175; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 175; *ibid.* Vol. VIII, 1896, p. 148.

Zenodoxus potentillæ HY. EDWARDS, Papilio, Vol. I, 1881, p. 205; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 175; *ibid.* Vol. VIII, 1896, p. 148.

Male.—Head brown, palpi pale yellow, marked with a little black. Antennæ pale dirty yellowish, pectinations black. Thorax brown with a few yellow scales. Abdomen with the first and last four segments broadly banded with yellow, the intermediate segments scaled with yellow. Anal tuft black. Legs black with yellow bands. Fore wings bronzy brown, more or less scaled with red. Hind wings opaque, bronzy brown. Underside similar to the upper, washed with yellow.

Female.—Similar to the male.

Expanse : Male and female, 20–24 mm.

Habitat.—California, Texas.

Types : *Z. heuchera* and *Z. potentilla*, two males and three females. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Paranthrene palmii ^{*}(*Neum.*).

PLATE XXXII, FIG. 15, MALE.

Larunda palmii NEUMOESEN, Ent. News, Vol. II, 1891, p. 108.

Zenodoxus palmii BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. VIII, 1896, p. 148.

Male.—Head black, palpi orange, collar in front orange, yellow behind. Antennæ reddish brown, pectinations black. Thorax black overcast with red scales; underside with a yellow patch on each side. Abdomen black, first segment yellow, last four segments with very broad yellow bands on the anterior parts; underside of abdomen with the bands orange. Anal tuft orange. Legs orange, femora black. Fore wings black, overcast with red scales; underside similar. Hind wings black with red shades, transparent basally; underside orange.

Female.—Larger than the male. Antennæ simple, and the wings are brighter red.

Expanse : Male, 15–25 mm.; female, 27 mm.

Habitat.—Arizona.

Types : Male. Coll. Chas. Palm; male and female, Coll. B. Neumoegen, Brooklyn Inst. Arts and Sciences; one male, Coll. Am. Mus. Nat. Hist.

Paranthrene canescens (*Hy. Edw.*).

PLATE XXXII, FIG. 13, MALE.

Zenodoxus canescens HY. EDWARDS, Papilio, Vol. I, 1881, p. 205; GROTE, New Check List N. Am. Moths, 1882, p. 12; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IV, 1892, p. 175; *ibid.* Vol. VIII, 1896, p. 148.

Male.—Head and palpi with mixed black and white hairs, giving the same a gray appearance. Antennæ gray, pectinations brown. Thorax and abdomen black, thickly scaled with gray above and below. Legs gray. Fore wings opaque, brown, densely covered with gray scales; underside brown, margins gray. Hind wings transparent along the middle, borders brown, fringes white. Underside scaled with gray white.

Female.—Similar to the male.

Expanse : Male and female, 18–24 mm.

Habitat.—Kansas, Colorado.

Type : One male. Coll. Hy. Edwards, Am. Mus. Nat. Hist.

Paranthrene mexicanus (*Beuten*).

PLATE XXXII, FIG. 12, MALE.

Zenodoxus mexicanus BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist. Vol. IX, 1897, p. 216.

Male.—Head black, palpi and collar white. Thorax black, patagia tipped with white. Abdomen black with a white band on the second and last four segments. Anal tuft black. Legs black with white bands. Fore wings brown black, white between the veins on the outer part. Hind wings black. Underside of all wings same as the upper.

Expanse : 12 mm.

Habitat.—New Mexico.

Type : One male. Coll. Am. Mus. Nat. Hist.

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Contains brief accounts of *Sphinx* (= *Ægeria*) *apiformis* (p. 461), and *Sphinx* (= *Sesia*) *tipuliformis* (p. 462). [8]
1771. DE GEER, CARL. *Mémoires pour servir à l' Histoire des Insectes*. Tom. II, Stockholm, 1771.
Contains accounts and figures of *Sphinx* (= *Ægeria*) *apiformis* (p. 227, pl. ii, fig. 11), and *Sphinx* (= *Sesia*) *tipuliformis* (p. 230, pl. ii, fig. 12). [9]
1773. MÜLLER, P. L. S. *Vollständiges Natursystem, nach der Zwölften lateinischen Ausgabe und nach anleitung des Holländischen Houttuynischen Werkes*, etc. Theil V, Nürnberg, 1773.
Brief descriptions (p. 644) of *Sphinx* (= *Ægeria*) *apiformis* and *Sphinx* (= *Sesia*) *tipuliformis*. [10]
1775. FABRICIUS, JOHANN CHRISTIAN. *Systema Entomologiæ*, etc. Flegensburgi et Lipsiæ, 1775.
Erects the genus *Sesia* (p. 549) for the following species: *S. tantalus*, *hylas*, *stellatarum*, *thysbe*, *fuciiformis*, *apiformis*, *hæmorrhoidalis*, *culiciformis*, and *tipuliformis*. [11]
1775. FUESSLY, JOHANN CASPAR. *Verzeichniss der ihm bekannten Schweizerischen Insecten*. Zürich, 1775.
Records (p. 33) *Sphinx* (= *Ægeria*) *apiformis* from Switzerland. [12]
1775. ROTTENBURG, S. A. VON. *Anmerkungen zu den Hufnagelschen Tabellen der Schmetterlinge*. *Der Naturforscher*, Stück VII, 1775.
Critical notes on the species mentioned by Hufnagel (1766). States that his *Sphinx vespiiformis*=*apiformis* and *S. salmachus*=*tipuliformis* (p. 108). [13]
1775. DENIS, MICHAEL, und SCHIFFERMÜLLER, IGNAZ. *Verzeichniss der Schmetterlinge der Wiener Gegend*. Wien, 1775.
Record (p. 305) *Sphinx crabroniformis* (= *Ægeria apiformis*), and (p. 544) *Sphinx* (= *Sesia*) *tipuliformis* from the vicinity of Vienna. [14]
1776. SULZER, JOHANN HEINRICH. *Abgekürzte Geschichte der Insecten, nach dem Linneischen System*. 1776.
Brief description and figure of *Sphinx* (= *Ægeria*) *apiformis* (p. 152, pl. xx, fig. 6). [15]

1776. HARRIS, MOSES. An Exposition of English Insects, etc. London, 1776.
Descriptions and colored figures of *Sphinx* (= *Egeria*) *apiformis* and *Sphinx* (= *Sesia*) *tipuliformis* (pl. iii, figs. 7 and 8). [16]
1776. MÜLLER, OTTO FRIEDERICH. Zoologiæ Danicæ prodromus, seu Animalium Daniæ et Norwegiæ, etc. Hafniæ, 1776.
Records (p. 116) *Sphinx* (= *Egeria*) *apiformis* from Denmark and Norway. (Not seen.) [17]
1777. GLADBACH, GEORG JACOB. Beschreibung neuer Europäischen Schmetterlingen, die weder im Roesel noch Kleemann beschrieben stehen. Frankfurt am Mayn, 1777.
Describes and figures *Sphinx* (= *Sesia*) *tipuliformis* (p. 60, pl. xxvi, fig. 5). [18]
1777. SCOPOLI, JOHANN ANTON. Introductio ad Historiam Naturalem, sistens Genera Lapidum, Plantarum et Animalium. Pragæ, 1777.
Proposes (p. 414) the genus *Trochilium*, but does not apply the name to any particular species. [19]
1777. FABRICIUS, JOHANN CHRISTIAN. Genera Insectorum eorumque Characteres Naturales secundum numerum, etc. Chilonii, 1777.
Restricts *Sphinx melas* Cramer (*Isanthrene melas*) to the genus *Sesia*. [20]
1778. GÖTZE, J. A. E. Des Herrn Baron Karl De Geer, Abhandlungen zur Geschichte der Insecten, aus den Französischen übersetzt und mit Anmerkungen herausgegeben von Johann August Ephraim Götze. Nürnberg, Zweiter Band, 1778.
Contains accounts and figures of *Sphinx* (= *Egeria*) *apiformis* (p. 163, pl. ii, fig. 11) and *Sphinx* (= *Sesia*) *tipuliformis* (p. 165, pl. ii, fig. 12). [21]
1778. FUESSLY, JOHANN CASPAR. Magazin für die Liebhaber der Entomologie, Tom. I, 1778, pp. 120 and 132, pl. i, fig. A.
Description and good colored figure of *Sphinx* (= *Egeria*) *apiformis*; also description of *Sphinx* (= *Sesia*) *tipuliformis*. [22]
1779. ESPER, EUGEN JOHANN CRISTOPH. Die Schmetterlinge in Abbildung nach den Natur mit Beschreibungen. Theil II, Nachtvögel, Erlangen, 1779.
States that *Sphinx vespiiformis* of Hufnagel (1766) and *Sphinx crabroniformis*, Denis and Schiffermüller (1775), are the same as *Sphinx* (= *Egeria*) *apiformis* (pp. 131-135, pl. xv, fig. 3). Descriptions and good colored figures of *Sphinx* (= *Egeria*) *apiformis* (pp. 207-208, pl. xxiv, figs. 2 and 3). Original description and figures of *Sphinx* (= *Egeria*) *tenebrioniformis* (pl. xxx, fig. 1). [23]
1781. FABRICIUS, JOH. CHRIST. Species Insectorum, Tom. II, Hamburgi et Kilonii, 1781.
Brief description of *Sesia* (= *Egeria*) *apiformis* (p. 156) and *Sesia tipuliformis* (p. 157). The term *Sesia* is used in the same sense as in 1775. [24]
1781. HARRIS, MOSES. An Exposition of English Insects, etc., 2nd Edit. London, 1781.
Same account of *Sphinx* (= *Egeria*) *apiformis* and *Sphinx* (= *Sesia*) *tipuliformis* as in the first edition (1776). [25]
1782. HARRIS, MOSES. An Exposition of English Insects, etc. London, 1782.
Contains the same accounts of *Sphinx* (= *Egeria*) *apiformis* and *Sphinx* (= *Sesia*) *tipuliformis* as in the first (1776) and second editions (1781). [26]
1782. ERNEST et ENGRAMELLE. Papillons d'Europe, etc., Tom. II. Paris, 1782.
Descriptions and colored figures of *Egeria apiformis*, wrongly determined as *Sphinx crabroniformis* (p. 32, pl. xci, fig. 121). [27]
1782. LANG, HEINRICH GOTTLÖB. Verzeichniss seiner Schmetterlinge meistens in den Gegenden um Augsburg gesammelt, etc. Augsburg, 1782.
Records *Sphinx* (= *Egeria*) *apiformis* (p. 60), from the vicinity of Augsburg, Germany. [28]
1783. RETZIUS, ANDREAS JOHANN. Genera et species Insectorum, etc. Lipsiæ, 1783.
Brief descriptions of *Sphinx* (= *Egeria*) *apiformis* and *Sphinx* (= *Sesia*) *tipuliformis* (p. 23). [29]
1787. FABRICIUS, JOHANN CHRIST. Mantissa Insectorum, etc., Tom. II. Hafniæ, 1787.
Brief descriptions of *Sesia apiformis* and *Sesia tipuliformis* (p. 99). Uses the term *Sesia* in the same sense as in 1775. [30]
1788. ZSCHACH, JOHANN JACOB. Museum N. G. Leskeanum. Pars Entomologica ad Systema Entomologiæ Cl. Fabricii Ordinata. Lipsiæ, 1788.
Brief notes on *Sesia* (= *Egeria*) *apiformis* and *Sesia tipuliformis* (p. 96). Uses the term *Sesia* for a mixed lot of species belonging to different genera. [31]

1789. LANG, HEINRICH GOTTLÖB. Verzeichniss seiner Schmetterlinge, etc. 2nd Edit., Augsburg, 1789.
Contains same mention of *Sphinx* (= *Ægeria*) *apiformis* as in the first edition (1782). [32]
1789. BORKHAUSEN, MORIZ BALTHASAR. Naturgeschichte der Europäischen Schmetterlinge. Tom. II, 1789.
Descriptions of *Sphinx* (= *Sesia*) *tipuliformis* (p. 127) and *Sphinx* (= *Ægeria*) *apiformis* (p. 132). [33]
1789. VIEWEG, CARL FRIEDRICH. Tabellarisches Verzeichniss der in der Churmark Brandenburg einheimischen Schmetterlinge. Berlin, 1789-1790.
Records *Sphinx* (= *Ægeria*) *apiformis* (p. 14) and *Sphinx* (= *Sesia*) *tipuliformis* (p. 19) from the province of Brandenburg, Germany. [34]
1789. VILLERS, CHARLES JOSEPH DE. Entomologia, Fauna Sueciæ, etc. Tom. II, Lugduni, 1789.
Records and descriptions of *Sphinx* (= *Ægeria*) *apiformis* (pp. 99) and *Sphinx* (= *Sesia*) *tipuliformis* from France. [35]
1789. SCHRANK, FRANZ VON PAULA. Entomologische Nachrichten. *Fuessly's Neues Mag. für Liebh. Entomologie*, Band II, 1789.
Critical review of the work by Denis and Schiffermüller (1775). States that their *Sphinx* (= *Ægeria*) *crabroniformis* is the same as *apiformis* (p. 199) and *Sphinx* (= *Sesia*) *salmachus* the same as *tipuliformis* (p. 204). [36]
1789. GMELIN, JOA. FRID. Systema Naturæ, per Regna Triâ Naturæ, etc. Tom. I, Lipsiæ, 1789.
Brief descriptions of *Sesia* (= *Ægeria*) *apiformis* and *Sesia* *tipuliformis* (p. 2388). The term *Sesia* is not used in a restricted sense. [37]
1790. ROSSI, PETER. Fauna Etrusca, sistens Insecta, quæ in provinciis Florentina et Pisana præsertini collegit. Tom. II, Liburni, 1790.
Records and describes *Sesia* (= *Ægeria*) *apiformis* and *S. tipuliformis* from Italy (p. 164). The term *Sesia* is not used in a restricted sense. [38]
1791. BRAHM, NICOLAUS JOSEPH. Insecten-Kalender für Sammler und Oekonomen. Theil II, Mainz, 1791. (Also under the title, Handbuch der Oekonomischen Insectengeschichte in Form eines Kalenders bearbeitet.)
Records time of appearance of *Sphinx* (= *Ægeria*) *apiformis* in Germany (p. 13). [39]
1791. JUNG, CONRAD CRISTOPH. Alphabetisches Verzeichniss der bisher bekannten Schmetterlinge aus allen Welttheilen mit ihren Synonymen. Marktbreit, 1791.
An alphabetical list of all the known Lepidoptera. Mention of *Sphinx* (= *Ægeria*) *apiformis* (p. 4) and *Sphinx* (= *Sesia*) *tipuliformis* (p. 241). [40]
1791. SCHWARZ, CHRISTIAN. Neuer Raupen-Kalender, etc. Tom. II, Nürnberg, 1791.
Brief note on and time of appearance of *Sphinx* (= *Ægeria*) *apiformis* in Germany (p. 360). [41]
1792. SCHNEIDER, DAVID HEINRICH. *Neuestes Magazin für Liebhaber der Entomologie*, Heft IV, 1792.
Description of *Sphinx* (= *Ægeria*) *apiformis* from Lapland (p. 429). Wrongly determined as *Sphinx* *crabroniformis*. [42]
1793. BORKHAUSEN, MORIZ BALTHASAR. *Rheinisches Magazin zur Erweiterung der Naturkunde*, 1793.
Contains a note on *Sphinx* (= *Ægeria*) *apiformis* (p. 312). (Not seen.) [43]
1793. FABRICIUS, JOHANN CHRISTIAN. Entomologia Systematica, etc. Tom. III, Hafniæ, 1793.
Brief descriptions of *Sesia* (= *Ægeria*) *apiformis* and *Sesia* *tipuliformis*. Uses the term *Sesia* in the same sense as in 1775 for a mixed lot of species. [44]
1793. DONOVAN, EDWARD. Natural History of British Insects, etc. Vol. II, London, 1793.
Descriptions and habits of *Sphinx* (= *Ægeria*) *apiformis* (p. 41, pl. xxv) and *Sphinx* (= *Sesia*) *tipuliformis* (p. 55, pl. lii) with good colored figures of adults, larvæ, and pupæ, and sections of food-plants showing the ravages of the larvæ. [45]

1794. ROSSI, PETER. Mantissa Insectorum, Exhibens Species Nuper in Etruria, etc. Tom. II, Pisa, 1794.
Descriptions and records of *Sphinx* (= *Ægeria*) *apiformis* (p. 15) and *Sphinx* (= *Sesia*) *tipuliformis* (p. 16) from Etruria. [46]
1796. HÜBNER, JACOB. Europäische Schmetterlinge, Zweite Horde. Die Schwärmer, etc., Augsburg, 1796.
Description and figure of *Ægeria apiformis*, wrongly determined as *Sphinx crabroniformis* (p. 23, pl. viii, fig. 51). [47]
1796. LATREILLE, PIERRE ANDRÉ. Précis des Caractères Génériques des Insectes, etc., Bourdeaux, 1796.
Gives a diagnosis of the genus *Sesia* but does not apply it to any particular species. The volume is not dated, but according to Hagen it was published in 1796. [48]
1797. ANON. (BERGSTRÄSSER.) Epitome Entomologiæ Fabricianæ. 1797.
Uses the term *Sesia*, p. 147, in the same sense as Fabricius (1775). Mention of *Sesia apiformis*. The author's name is not given on the title-page, but according to Hagen (Bibliotheca Entomologica, 1862, p. 221), Bergsträsser is the author. [49]
1797. LEWIN, JOHN WILLIAM. Observations respecting some rare British Insects (*Sphinx apiformis*, *crabroniformis*, etc.). *Trans. Linn. Soc. London*, Vol. III, 1797, pp. 1-2, pl. i, figs. 1-5.
Account of *Sphinx* (= *Ægeria*) *apiformis*, with good colored figures of adult, larva, and section of food-plant with pupa protruding. [50]
1798. CUVIER, G. Tableau Élémentaire d'Histoire Naturelle des Animaux. Paris, An 6.
In this volume (p. 393) *Sphinx* (= *Macroglossum*) *stellatarum* is restricted to the genus *Sesia*. [51]
1801. LASPEYRES, JACOBO HENRICO. Sesiæ Europæ, Iconibus et Descriptionibus illustratæ. Berolini, 1801, pp. 1-31, pl. i.
Apparently the first monograph of the Sesiidæ of Europe. Contains detailed descriptions of the general characters of the family which he calls Sesiæ, and excellent diagnoses of the species with synonymy and bibliography. Uses the term *Sesia* in a restricted sense for twenty-one species. *Sesia* (= *Ægeria*) *apiformis* (p. 7) and *Sesia tipuliformis* (p. 28). [52]
1801. LAMARCK, JEAN BAPTISTE PIERRE DE, etc. Système des Animaux sans Vertèbres, etc. Tom. VIII, Paris, 1801.
In this volume the term *Sesia* is restricted to *Sphinx* (= *Hemaris*) *fuciformis* (p. 281). [53]
1801. SCHRANK, FRANZ VON PAULA. Fauna Boica. Tom. II, Nürnberg, 1801.
Restricts (p. 233-234) the genus *Sesia* to the following species: *S. apiformis*, *tabaniformis*, *stomoxiformis*, *culciformis*, *tipuliformis*, and *fenestrina*. Briefly characterizes the family, which he calls "Unruhe," gives habits of the larvæ and their transformations. All the species here mentioned are true Sesiids, with the exception of *fenestrina*, which is a Thyrid. [54]
1802. HAWORTH, ADRIAN HARDY. Prodrum Lepidopterorum Britannicorum, a concise Catalogue of British Lepidopterous Insects, etc. Holt, 1802.
Mentions *Sphinx* (= *Ægeria*) *apiformis* (p. 5) and *Sphinx* (= *Sesia*) *tipuliformis* (p. 6). [55]
1802. STEWART, —. Elements of Natural History; being an introduction to the Systema Naturæ of Linnæus. London and Edinburgh, 1802.
Brief accounts (p. 139) of *Sphinx* (= *Ægeria*) *apiformis* and *Sphinx* (= *Sesia*) *tipuliformis*, with habits of larvæ and food-plants. [56]
1802. WALCKENAER, CHARLES ATHANASIE DE. Fauna Parisienne, etc. Tom. II, Paris, 1802.
Description (p. 281) of *Sesia* (= *Ægeria*) *apiformis*. Uses the term *Sesia* for a number of species found in the vicinity of Paris. [57]
1803. MEASE, JAMES. Archives of Useful Knowledge, Vol. III, 1803, pp. 40-42.
Brief account of peach-borer (= *Sanninoidea exitiosa*). (Not seen.) [58]
1803. OLIVIER et LATREILLE. Nouveau Dictionnaire d'Histoire Naturelle, etc. Tom. XX, Paris, 1803.
Descriptions (p. 444) of *Sesia* (= *Ægeria*) *apiformis* and *Sesia tipuliformis* (p. 446). Gives a general account of the family. [59]

1804. PANZER, GEORG WOLFGANG FRANZ. Systematische Nomenclatur über weiland des Herrn Dr. Jacob Christian Schaeffers natürlich ausgemahlte Abbildungen Regensburger Insecten. Erlangen, 1804.
Identifies the species figured by Schaeffer (1767). (Not seen.) [60]
1805. BARTON, BENJAMIN SMITH. *Philadelphia Med. and Phys. Journ.*, Vol. I, Pt. II, 1805, p. 129.
Refers to *Zygæna persicæ* (= *Sanninoidea exitiosa*) as being injurious to the roots of the peach. It is recorded (Harris, 1826) that the insect was first described and given its scientific name by Barton, but the name is *nomen nudum*. [61]
1805. LATREILLE, PIERRE ANDRÉ. Histoire Naturelle, Générale et Particulière des Crustacés et des Insectes, etc. Tom. XIV, Paris, 1805.
Descriptions (p. 156) of *Sesia* (= *Ægeria*) *apiformis* and *Sesia tipuliformis* and other European species. Uses the term *Sesia* in a restricted sense like Laspeyres (1801). [62]
1806. SHAW, GEORGE. General Zoology, or Systematic Natural History. Vol. VI, Pt. I, London, 1806.
Very brief note (p. 222) on *Sphinx* (= *Ægeria*) *apiformis*. Records the lime-tree as one of the food-plants of this species. [63]
1806. TURTON, WILLIAM. A General System of Nature, through the Three Grand Kingdoms of Animals, Vegetables, and Minerals, etc. Vol. III, Insects, Pt. II, London, 1806.
Very brief descriptions (p. 180) of *Sesia* (= *Ægeria*) *apiformis* and (p. 181) *Sesia tipuliformis*. Does not use the term *Sesia* in a restricted sense. [64]
1806. HÜBNER, JACOB. Tentamen, etc., 1.
Restricts the term *Sesia* to *S. culiciformis* which apparently is the first valid restriction of the genus to a particular species. [65]
1807. FABRICIUS, JOHANN CHRISTIAN. Systema Glossatum Secundum Ordines, Genera, Species adietis Synonymus, Locis, Observationibus, Descriptionibus. Brunsvici: apud Carolum Reichard, 1807.
According to Hagen (Bibliotheca Entomologica, 1862, p. 222) this work was not published (nicht publicirt), but that a printed copy containing 112 pages is in the library of Mr. Dohrn in Stettin. In the library of the American Museum of Natural History is a copy with the above title, containing pages i-xii, and 13-80. The first part (i-xii) contains a brief review of the genera described in the pages following. The term *Ægeria* is proposed for species already restricted to *Sesia* by Laspeyres (1801). The term *Sesia* is used for *Sphinx ænothææ*, *S. stellatarum*, *S. fuciformis*, etc. [66]
1807. ILLIGER, KARL. Die Neueste Gattungs-Eintheilung der Schmetterlinge aus den Linneischen Gattungen Papilio und Sphinx. *Mag. Insectenkunde*, Sechster Band, Braunschweig, 1807, pp. 277-289.
Reviews the genera and classifications proposed by Fabricius (1807) and Latreille (1805). [67]
1808. COOPER, J. *Mem. Phila. Soc. Prom. Agr.*, Vol. I, 1808, pp. 11-14.
In a paper read Jan. 14, 1806, he gives a brief but good account of the life-history and methods of controlling the peach-borer (= *Sanninoidea exitiosa*). A combination of "digging out" and mounding methods was very successful. (Not seen.) [68]
1808. OCHSENHEIMER, FERDINAND. Die Schmetterlinge von Europa. Bd. II, 1808, pp. 121-182.
Places all the species after the genera *Zygæna*, *Syntomis* and *Thyris*. Descriptions of 26 species of *Sesia* of Europe with full synonymy, very carefully compiled. Places all the species in *Sesia*, in this respect following Lespayres (1801). Descriptions of *Sesia* (= *Ægeria*) *apiformis* (p. 121) and *Sesia tipuliformis* (p. 171). [69]
1808. PETERS, R. *Mem. Phila. Soc. Prom. Agr.*, Vol. I, 1808, pp. 15-19.
Records the failure to prevent the work of the peach-borer (= *Sanninoidea exitiosa*) by the use of twenty-five or more different "washes." Records exposing roots in winter and using boiling hot soap-suds or water in August or September. (Not seen.) [70]
1808. MATLACK, T. *Mem. Phila. Soc. Prom. Agr.*, Vol. I, 1808, pp. 273-279.
Supposes there are two broods of peach-borers (= *Sanninoidea exitiosa*). Detailed account of successful use of sand (not loam) in earthen cylinders or in a pile around base of tree. (Not seen.) [71]

1809. LATREILLE, PIERRE ANDRÉ. *Genera Crustaceorum et Insectorum*, etc. Parisiis et Argentorati, Tom. IV, 1809.
Places the Sesiidæ among the Zygaenidæ (p. 211) and uses the term *Sesia* in a restricted sense, like Laspeyres (1801). Makes *Trochilium* Scopoli (1777) and *Ægeria* Fabricius (1807) synonyms of *Sesia*. Notice of *Sesia* (= *Ægeria*) *apiformis* and three other species of Europe. [72]
1813. COCKE, J. H. *Archives of Useful Knowledge*, Vol. III, 1813, pp. 40-42.
Good account of life-history of peach-borer (= *Sanninoidea exitiosa*). Failed with straw but was very successful with tobacco leaves around base of tree. No scientific name given to the insect. (Not seen.) [73]
1815. OKEN, LORENZ. *Lehrbuch der Naturgeschichte*. Tom. III, Zoologie, 1815-1816.
Changes the name *Sesia* to *Setia*. (Not seen.) [74]
1815. LEACH, WILLIAM ELFORD. *Brewster's Edinburgh Encyclopædia*. Vol. IX, 1815, p. 131.
Uses the term *Ægeria* for *Sesia apiformis* and *Sesia tipuliformis*. [75]
1816. DALMAN, JOHANN WILHELM. *Forsök till Systematik Uppställning af Sveriges Tjarillar*. *Köngl. Vetensk. Akad. Handl.*, T. 37, 1816, p. 217.
Records nine species of Sesiidæ from Sweden, including *Sesia* (= *Ægeria*) *apiformis* and *Sesia tipuliformis*. [76]
1816. HÜBNER, JACOB. *Verzeichniss bekannter Schmetterlinge*. Augsburg, 1816.
Erects the genus *Sphecia* (= *Ægeria* Fabr.) for *Sphinx apiformis* Linn. (1761) and *Sph. bembeciformis* (p. 127); *Melitia* for *Sphinx bombiformis* Cramer (p. 128); *Bembecia*, *Synanthedon*, and *Conopia* (p. 118) for a number of species referable to *Sesia* Hübner, 1806. [77]
1817. STEWART. *Elements of Natural History*, etc. 2nd Edit., London, 1817.
Same account (p. 149) of *Sphinx* (= *Ægeria*) *apiformis* and *Sphinx* (= *Sesia*) *tipuliformis* as in the first edition (1802). [78]
1819. OLIVIER et LATREILLE. *Nouveau Dictionnaire d'Histoire Naturelle*. Tom. XXXI, Paris, 1819.
Similar account of the Sesiidæ as given in the previous edition (1803), but gives a figure of *Sesia* (= *Ægeria*) *apiformis* (p. 105, pl. xxiv, fig. 2). [79]
1819. SAMOUELLE, GEORGE. *The Entomologist's Useful Compendium, or an Introduction to the Knowledge of British Insects*, etc. London, 1819.
Notes on occurrence of *Ægeria* (= *Ægeria*) *apiformis* and *Trochilium* (= *Sesia*) *tipuliformis* in England. [80]
1820. COCKE, J. H. *American Farmer*, Vol. I, 1820, pp. 350-351.
Same account of the peach-borer (= *Sanninoidea exitiosa*) as in Mease, *Archiv. Useful Know.*, 1803. (Not seen.) [81]
1820. "W. T.," (Washington, D. C.) *Plough Boy*, Vol. I, 1820, p. 331.
Brief account of life-history of the peach insect (= *Sanninoidea exitiosa*). Counted 678 eggs in one female. (Not seen.) [82]
1821. GODARD, JEAN BAPTISTE. *Histoire Naturelle des Lépidoptères ou Papillons Diurnes des environs de Paris*. Descrits par M. Godart, peirets par M. C. Vauthier. Tom. III, Paris, 1821.
Descriptions and figures of *Sesia* (= *Ægeria*) *apiformis* (p. 78, pl. xxi, fig. 1) and *Sesia tipuliformis* (p. 114). [83]
1822. THATCHER, J. *American Orchardist*, 1822, p. 198.
Brief account of peach-borer (= *Sanninoidea exitiosa*), quoted from Mease (1803). (Not seen.) [84]
1823. WORTH, JAMES. *An Account of the Insect so Destructive to the Peach Tree*. *Journ. Acad. Nat. Sci. Phil.*, Vol. III, 1823, pp. 217-221.
Very good account of the life-history of *Ægeria* (= *Sanninoidea*) *exitiosa*; egg first described. A sensible discussion of methods of combating the insect. [85]
1823. SAY, THOMAS. *Journ. Acad. Nat. Sci. Phila.*, Vol. III, 1823, p. 216.
Original description of *Ægeria* (= *Sanninoidea*) *exitiosa*, in an article by Worth (1823). [86]
1823. CURTIS, JOHN. *British Entomology*, etc. Vol. VIII, London, 1823.
Description and figure of *Trochilium* (= *Ægeria*) *apiformis* (p. 372.) [86a]

1824. HAINES, R. *Amer. Farmer*, Vol. VI, 1824, p. 401.
Records success with sand in mounds and in boxes or cases around base of tree against ravages of peach-borer (= *Sanninoidea exitiosa*). (Not seen.) [87]
1824. THOMAS, E. *Amer. Farmer*, Vol. VI, 1824, p. 37.
Account of life-history of *Sanninoidea exitiosa*; thought there were two broods. Briefly describes the female as a Hymenopteron, *Apis persica*. Borers numerous in nursery stock. (Not seen.) [88]
1824. "AGRICOLA" (N. Carol.). *Amer. Farmer*, Vol. VI, 1824, p. 14.
Brief account of life-history of peach-borer (= *Sanninoidea exitiosa*); thought moth perforated bark to lay eggs. (Not seen.) [89]
1824. SMITH, J. *Amer. Farmer*, Vol. VI, 1824, pp. 324-325.
Very good summary of methods recommended against *Ægeria* (= *Sanninoidea exitiosa*). Quotes Worth's (1823) article entire. [90]
1824. SHOTWELL, W. *Amer. Farmer*, Vol. VI, 1824, p. 14.
Records the successful use of lime mortar wash against peach-borer (= *Sanninoidea exitiosa*). (Not seen.) [91]
1825. OLIVIER, ANTOINE GUILLAUME. *Encyclopédie Méthodique Dictionnaire des Insectes*. Paris, 1825.
Note on and figure (pl. lxvii, fig. 4) of *Sesia crabroniformis* (= *Ægeria apiformis*). [92]
1825. HÜBNER, JACOB. *Zuträge zur Sammlung Exotischer Schmetterlinge*, etc. Augsburg, 1825.
Good colored figures of females of *Paranthrene pepsidiformis* (= *Sanninoidea exitiosa*) pl. xxxii, figs. 533-534 and *Melittia satyriniformis* (figs. 453-454). [93]
1825. SAY, THOMAS. *American Entomology*, etc. Vol. II, 1825.
Revision of the original description of *Ægeria* (= *Sanninoidea exitiosa*). Quotes Worth (1823), Shotwell (1824), and Thomas (1824) regarding habits and methods of preventing the ravages of the insect. Male and female moths, cocoon, and the pupa-case are figured (pl. xix). [94]
1826. HARRIS, THADDEUS WILLIAM. *Peach-Tree Insect*. *New Eng. Farmer*, Vol. V, 1826, pp. 33 and 170.
Perhaps the best of the earliest accounts of *Sanninoidea exitiosa* (p. 33). The insect is described as *Ægeria persica*, and statement made that this name of Barton's (1805) has priority over Say's *exitiosa* (1823). Recommendations of Worth (1823), Shotwell (1824), and Thomas (1824) summarized. Finds there is but one brood of this insect in a year. (We are unable to find any description of Barton's species. The name is *nomen nudum*.) Note on *Ægeria* (= *Sesia*) *tipuliformis* (p. 170). [95]
1826. RISSO, J. A. *Histoire Naturelle des principales productions de l'Europe Méridionale*, etc. Tom. V, Paris, 1826.
Mention of *Sesia* (= *Ægeria*) *apiformis* and *Sesia tipuliformis* (p. 243). [96]
1827. MEIGEN, JOHANN WILHELM. *Handbuch für Schmetterlingsliebhaber besonders für Anfänger im Sammeln*. Aachen, 1827.
Brief notes on *Sesia* (= *Ægeria*) *apiformis* (p. 87) and *Sesia tipuliformis* (p. 89). [97]
1827. STABLER, T. P. *Amer. Farmer*, Vol. IX, 1827, p. 29.
Experiments against ravages of peach-borer (= *Sanninoidea exitiosa*), showing that a mortar of cow-dung and clay was not always effectual. (Not seen.) [98]
1827. DUMÉRIL, ANDRÉ MARIE CONSTANT. *Dictionnaire des Sciences Naturelles*. Tom. XLIX, Strasbourg et Paris, 1827.
Gives diagnosis of Sesiidæ in general, and their transformations (p. 51). Describes *Sesia* (= *Ægeria*) *apiformis* (p. 52). [99]
1828. TIGNY, F. M. S. T. DE. *Histoire Naturelle des Insectes*, etc. Tom. IX, Paris, 1828.
Account and figure of *Sesia* (= *Ægeria*) *apiformis* (p. 116, pl. xvi, fig. 1). [100]
1828. HARRIS, THADDEUS WILLIAM. *Insects*. *New Eng. Farmer*, Vol. VII, 1828, p. 33.
Contains the original description of *Ægeria* (= *Melittia*) *cucurbita*. [101]
1828. STEPHENS, JAMES FRANCIS. *Illustrations of British Entomology*, etc., *Haustellata*. Vol. II, London, 1828.
Descriptions and habits of *Trochilium* (= *Ægeria*) *apiformis* (p. 137) and *Ægeria* (= *Sesia*) *tipuliformis* (p. 142). [102]

1828. BOITARD, PIERRE. Manual d'Entomologie, etc. Tom. II, Paris, 1828.
Brief description of *Sesia* (= *Ægeria*) *apiformis* and *Sesia tipuliformis* (p. 319). [103]
1829. STEPHENS, JAMES FRANCIS. The Nomenclature of British Insects, etc. London, 1829.
Mention of *Trochilium* (= *Ægeria*) *apiformis* and *Ægeria* (*Sesia*) *tipuliformis* (p. 39). [104]
- 1829-1844. GUÉRIN-MÉNEVILLE. Iconographie der Règne Animal. Tom. VII, Paris, 1829-1844.
Contains the original description and good colored figure of *Sesia* (= *Memythrus*) *asilipennis* (p. 496, pl. lxxxiv, fig. 3). [105]
1829. STEPHENS, JAMES FRANCIS. A Systematical Catalogue of British Insects, etc. London, 1829.
Mention of *Trochilium* (= *Ægeria*) *apiformis* (p. 34) and *Ægeria* (= *Sesia*) *tipuliformis* (p. 36). [106]
1829. BOISDUVAL, JEAN ALPHONSE. Europæorum Lepidopterorum Index Methodicus, etc. Paris, 1829.
Mention of *Sesia* (= *Ægeria*) *apiformis* (p. 29) and *Sesia tipuliformis* (pp. 30 and 31). [107]
1830. HARRIS, THADDEUS WILLIAM. Insects. *New Eng. Farmer*, Vol. IX, 1830, pp. 1-2.
Original description and account of *Ægeria* (= *Sesia*) *pyri*. [108]
1830. MEIGEN, JOHANN WILHELM. Systematische Beschreibung der Europæischen Schmetterlinge. Band II, Aachen, 1830.
Contains descriptions of 33 species of Sesiidæ of Europe. Calls them all *Setia*. Descriptions of *S.* (= *Ægeria*) *apiformis* (p. 103) and *S.* (= *Sesia*) *tipuliformis* (p. 119). [109]
1832. GRIFFITH, EDWARD. Animal Kingdom. London, 1832.
Figure (pl. lxxxiii, fig. 3) of *Sesia* (= *Memythrus*) *asilipennis* copied from Guérin-Ménéville (1829). [110]
1832. RENNIE, JAMES. Conspectus of British Butterflies and Moths. London, 1832.
Descriptions and habits of *Trochilium* (= *Ægeria*) *apiformis* (p. 27) and *Ægeria* (= *Sesia*) *tipuliformis* (p. 28). [111]
1832. BROWN, THOMAS. Book of Butterflies, Sphinxes and Moths. London, 1832.
Article on *Sphinx* (= *Sanninoidea*) *exitiosa*, quoted from Worth and Say (1823), p. 19. Figure of adults (fig. 63). [112]
1832. NEWMAN, EDWARD. *Sphinx vespiformis*. An Essay. 8vo, London, Westley and Davis, 1832.
Attempts to prove the identity of *Ægeria asiliformis* of modern writer with *Sphinx vespiformis* of Linné, and erects the genus *Memythrus* for the same. (It is the species we know as *Sciapteron tabaniformis* of Europe.) [113]
1832. NEWMAN, EDWARD. *Sphinx vespiformis*. An Essay. *Ent. Mag.*, Vol. I, 1832, pp. 45-47.
Review of the preceding paper. [114]
1832. NEWMAN, EDWARD. Monographia *Ægeriarum* Angliæ. *Ent. Mag.*, Vol. I, 1832, pp. 66-84.
Monograph of English *Ægeriidae* (= Sesiidæ). Gives general characters of family and affinities. Good diagnosis of genera and species. Restricts *Sphinx apiformis* Linné (1758) to the genus *Ægeria* Fabricius (1807); *Sphinx chrysidiiformis* to *Pyropteron* (gen. nov.); *Sph. ichneumoniformis* Esper to *Bembecia* Hübner (1816); *Sphinx æstriiformis* Rottemburg to *Synanthedon* Hübner (1816); *Sphinx tipuliformis* Clerck and three other species to *Trochilium* Scopoli (1777); *Sphinx myopiiformis* Borkhausen to *Conopia* Hübner (1816); *Sphinx vespiformis* to *Paranthrene* Hübner (1816). The latter species was previously placed by him in the genus *Memythrus*. (*Sphinx vespiformis*, An Essay, 1832.) [115]
1833. STEPHENS, JAMES FRANCIS. Nomenclature of British Insects, etc. 2nd Edit., London, 1833.
Same mention of *Trochilium* (= *Ægeria*) *apiformis* and *Ægeria* (= *Sesia*) *tipuliformis* as in the first edition (1829). [116]
1834. TREITSCHKE, FRIEDRICH. Die Schmetterlinge von Europa. Band X, Leipzig, 1834.
Description (p. 116) of a very curious hermaphrodite of *Sesia* (= *Ægeria*) *apiformis*, in which the left side is entirely discolored, while the right side is normal. [117]
1834. LUCAS, HIPPOLYTE. Histoire Naturelle des Lépidoptères d'Europe, etc. Paris, 1834.
Accounts and figures (pl. lii) of *Sesia tipuliformis* (p. 98) and *Sesia* (= *Ægeria*) *apiformis* (p. 106), also of other European species. [118]
1835. SENEX [Kinderhook, N. Y.]. *The Cultivator*, Vol. II, 1835, p. 40.
First saw the peach-borer (= *Sanninoidea exitiosa*) near Philadelphia in 1800 and in Kinderhook, N. Y., in 1807. (Not seen.) [119]

1835. WILSON, JAMES. A Treatise on Insects, General and Systematic, reprinted from the Encyclopedia Britannica, 7th Ed., with 20 pls. containing 540 figs. Edinburgh, 1835, pp. 1-327.
Gives an uncolored figure of *Sesia* (= *Memythrus*) *asilipennis*, copied from Guérin-Ménéville (1829). [120]
1835. LAMARCK, JEAN BAPTISTE PIERRE, etc. Histoire Naturelle des Animaux sans Vertèbres. Paris, 1835, Tom. IV, pp. 230 and 231.
Accounts of *Sesia* (= *Egeria*) *apiformis* (p. 230) and *Sesia tipuliformis* (p. 231). [121]
1836. BOISDUVAL, JEAN ALPHONSE. Histoire Naturelle des Insectes Spécies Général des Lépidoptères. Suites à Buffon. Tom. I, Paris, 1836.
Original description of *Sesia mellinipennis* with good colored figure (pl. xiv, fig. 12). [122]
1836. WESTWOOD, JOHN OBADIAH. Trans. Ent. Soc. London, Vol. V, 1836, pt. 17.
Note on *Sesia* (= *Egeria*) *apiformis* with black scales on the wings at emergence from chrysalis. [123]
1836. DUNCAN, JAMES. The British Moths, Sphinxes, etc. Jardine's Naturalist's Library, Vol. IV, Edinburgh, 1836.
Diagnosis of genus *Trochilium* (= *Egeria*) with description and colored figure of *T. apiformis* (pp. 171-173, pl. xiii, fig. 1). [124]
1836. DOUBLEDAY, EDWARD. Remarks on the Entomology of Epping and its Vicinity. Ent. Mag., Vol. III, 1836, p. 385.
Note on occurrence of *Egeria* (= *Sesia*) *tipuliformis* in Epping, England. [125]
1839. HARRIS, THADDEUS WILLIAM. Descriptive Catalogue of North American Insects, belonging to the Linnean Genus Sphinx, etc. Am. Journ. Arts and Sci., Vol. XXXVI, 1839, pp. 282-320.
Original descriptions of *Trochilium* (= *Bembecia*) *marginatum*, *Trochilium* (= *Egeria*) *tibiale* (p. 309), *Trochilium* (= *Memythrus*) *denudatum*, *Egeria* (= *Memythrus*) *trilineata* (p. 310), *Egeria* (= *Alcathoe*) *caudata*, *Egeria* (= *Podosesia*) *syringæ* (p. 311), *Egeria* (= *Sesia*) *fulvipes* (p. 312), and *Egeria* (= *Sesia*) *scitula*; also descriptions of *Egeria cucurbitæ* (= *Melittia satyriniformis* Hübner), *Egeria* (= *Sanninoidea*) *exitiosa* Say, *Egeria* (= *Sesia*) *pyri* Harris and *Egeria* (= *Sesia*) *tipuliformis* Clerck. [126]
1839. GUÉRIN-MÉNEVILLE. Dictionnaire Pittoresque d'Histoire Naturelle, etc. Tom. IX, 1839.
Description of *Sesia* (= *Egeria*) *apiformis* and habits of larva (p. 42). [127]
1839. LANCASTER, S. The Cultivator, Vol. VI, 1839, p. 133.
Notes on the development of the peach-borer (= *Sanninoidea exitiosa*) in Tennessee. (Not seen.) [128]
1839. WOOD, WILLIAM. Index Entomologicus, etc. London, 1839.
Colored figures of *Trochilium* (= *Egeria*) *apiformis* and *Egeria* (= *Sesia*) *tipuliformis*. [129]
1840. RATZBURG, JULIUS THEODOR CHRISTIAN. Die Forstinsekten, etc. Dritter Theil, Berlin, 1840.
A general and very good account of life-history of *Sesia* (= *Egeria*) *apiformis*. Good colored figures of adults, pupa, larva, and section of tree showing ravages of larva, with pupa-case protruding (pp. 77-81, pl. iii, fig. 3, and pl. iv, fig. 4). [130]
1840. ZETTERSTEDT, JOHANN WILHELM. Insecta Lapponica descripta. Lipsiæ, 1840.
Record of *Sesia* (= *Egeria*) *apiformis* and *Sesia tipuliformis* in Lapland (pp. 918 and 919). [131]
1840. ZELLER, PHILIPP CHRISTOPH. Lepidopterologische Beiträge. Isis, Vol. I, 1840, pp. 115-143.
Brief descriptions of European Sesiidæ, including *Sesia* (= *Egeria*) *apiformis* and *Sesia tipuliformis*. [132]
1840. WESTWOOD, JOHN OBADIAH. An Introduction to the Modern Classification of Insects, etc. Vol. II, London, 1840.
Very good detailed account (pp. 372 and 373) of the structural characters of the *Egeriidæ* (= Sesiidæ). Figures of adult, larva, and pupa of *Egeria* (= *Sesia*) *tipuliformis*. [133]
1840. BOISDUVAL, JEAN ALPHONSE. Genera et Index Methodicus Europæorum Lepidopterorum. Paris, 1840.
Diagnosis of genus *Sesia* (p. 42) and list of species of Europe. Mention of *Sesia tipuliformis* (p. 43) and *Sesia* (= *Egeria*) *apiformis* (p. 44). [134]

1841. ANON. *The Cultivator*, Vol. VIII, 1841, pp. 90 and 95.
Records planting a red-cedar tree with the peach against attack of the peach-borer (= *Sanninoidea exitiosa*).
The odor of the cedar thought to keep away the insect (p. 90). Also records (p. 95) that Dr. Anderson of
Virginia had practised this method with success. (Not seen.) [135]
1841. HARRIS, THADDEUS WILLIAM. A Report on the Insects of Massachusetts, Injurious to
Vegetation, etc. Cambridge, 1841.
Contains accounts of the following species: *Trochilium denudatum* (= *Memythrus asilipennis*), *Egeria*
cucurbitæ (= *Melittia satyriniformis*), *Egeria* (= *Sanninoidea*) *exitiosa*, *Egeria* (= *Sesia*) *tipuliformis*,
and *Egeria* (= *Sesia*) *pyri* (pp. 230-237). [136]
1841. HERING, EDUARD. Insecten Fauna Pommerns. *Ent. Zeit. Stettin*, 1841, p. 28.
Record of *Sesia* (= *Egeria*) *apiformis* found in Pommerania. [137]
1842. HARRIS, THADDEUS WILLIAM. The Squash-vine Destroyer. *New Eng. Farmer*, Vol. XX,
1842, p. 260.
Habits, transformations and figure of *Egeria cucurbitæ* (= *Melittia satyriniformis*). [138]
1842. HARRIS, THADDEUS WILLIAM. A Treatise on some of the Insects of New England which
are Injurious to Vegetation. Cambridge, 1842.
Same account (pp. 230-237) of Sesiidæ as in the original edition (1841). [139]
1842. HARRIS, THADDEUS WILLIAM. Squash-vine Destroyer. *Mass. Ploughman*, Vol. I, 1842,
June 11, No. 37.
Habits and ravages of *Egeria cucurbitæ* (= *Melittia satyriniformis*). (Not seen.) [140]
1843. HEYDENREICH, GUSTAV HEINRICH. Verzeichniss der Europäischen Schmetterlinge nach
Ochsenheimer and Treitschke. Weissenfels, 1843.
Mention of *Sesia* (= *Egeria*) *apiformis* and *Sesia tipuliformis* (p. 19). [140a]
1843. BOITARD, PIERRE. Nouveau Manual complet d'Entomologie ou Histoire Naturelle des
Insectes et des Myriapodes. Tom. III, Paris, 1843.
Brief descriptions of *Sesia* (= *Egeria*) *apiformis* (p. 229) and *Sesia tipuliformis* (p. 230). [141]
1843. HARRIS, THADDEUS WILLIAM. Peach-tree Worms. *Mass. Ploughman*, Vol. II, 1843, p. 1.
Characters and figures of *Egeria* (= *Sanninoidea*) *exitiosa*; its ravages and remedies. (Not seen.) [142]
1844. GAYLORD, W. A Treatise on Insects Injurious to Field Crops, Fruit Orchards, Vegetable
Gardens, and Domestic Animals. *Trans. New York Agri. Soc.*, 1843 (1844), pp. 161-
162.
Brief general account of *Egeria* (= *Sanninoidea*) *exitiosa*, compiled from Harris (1841). Rather crude
figures of adult, cocoon, and pupa-skin adapted from Say (1825). Suggests salt around the tree as a
remedy against the attack of this insect. [143]
1844. EVERSMAUN, EDUARD. Fauna Lepidopterologica Volgo-Uralensis, etc. Casan, 1844.
Record (pp. 100 and 104) of *Sesia* (= *Egeria*) *apiformis* and *Sesia tipuliformis*. [144]
1845. HERRICH-SCHAEFFER, GOTTLIEB AUGUST WILHELM. Systematische Bearbeitung der Schmet-
terlinge von Europa, etc. Vol. II, Regensburg, 1845.
Descriptions and habits (p. 61) of *Trochilium* (= *Egeria*) *apiformis* and *Sesia tipuliformis*. Restricts the
genus *Bembecia* Hübner (1816) to *Sesia hylæiformis* Laspeyres (1801). [145]
1845. WOOD, WILLIAM. Index Entomologicus, etc. 2nd Edit., London, 1845.
Same figures of *Trochilium* (= *Egeria*) *apiformis* and *Egeria* (= *Sesia*) *tipuliformis* as in the first edition
(1839). [146]
1845. DOWNING, C. Fruit and Fruit Trees, 1845.
Brief compiled account of *Egeria* (= *Sanninoidea*) *exitiosa*, not changed in subsequent editions (pp. 460,
461). Records air-slacked lime or ashes as a remedy. (Not seen.) [147]
1845. BLISSON, J. F. J. Notice sur les Mœurs des Larves des Sésies. *Ann. Soc. Ent. France*, 2d
ser. Tom. IV, 1845, pp. 208 and 219.
Descriptions of the larvæ of *Sesia* (= *Egeria*) *apiformis* and *Sesia tipuliformis*, also of other European
species. [148]
1845. BLANCHARD, ÉMILE. Histoire des Insectes, etc. Tom. II, Paris, 1845.
Description (p. 353) of *Sesia* (= *Egeria*) *apiformis*. [149]

1846. HEYDENREICH, GUSTAV HEINRICH. Verzeichniss der Europäischen Schmetterlinge, etc. 2nd Edit., Leipzig, 1846.
Same mention (p. 19) of species as in the first edition (1843). [150]
1846. ANON. *The Cultivator*, Vol. III, New Series, 1846, p. 217.
Good general compilation of peach-borer (= *Sanninoidea exitiosa*) with illustrations of work of borer in tree and of a cocoon. (Not seen.) [151]
1846. L'HOMMEDIEU. *Trans. Cincinnati Hort. Soc.* for 1843-1845 (1846), p. 17.
Records salt and saltpetre as used without success as a remedy against the peach-borer (= *Sanninoidea exitiosa*), but that slacked lime gave good results. (Not seen.) [152]
1848. WESTWOOD, JOHN OBADIAH. *The Cabinet of Oriental Entomology*, etc. London, 1848.
Original figure (pl. xxx, fig. 6) of *Trochilium ceto* (= *Melittia satyriniformis*). Wrongly records the species from China. [153]
1849. FIXSEN, H. J. Lepidopteren-Verzeichniss der Umgegend von St. Petersburg. *Bull. Soc. Imp. Nat., Moscow*, Vol. XXIII, 1849, p. 170.
Mention of *Sesia* (= *Egeria*) *apiformis* and *Sesia tipuliformis*. [154]
1850. HERRICH-SCHAEFFER, GOTTLIEB AUGUST WILHELM. Sammlung neuer oder wenig bekannter Aussereuropäischer Schmetterlinge. Regensburg, 1850-1858.
Original figure (p. 224, pl. lvii, fig. 217) of *Trochilium vespipenne* (= *Memythrus asilipennis* ♀). Wrongly records the species from China. [155]
1850. NICKERL, FRANZ ANTON. Synopsis der Lepidopteren Fauna Böhmens. Prag, 1850.
Records (p. 25) *Sesia* (= *Egeria*) *apiformis* and *Sesia tipuliformis* from Bohemia. [156]
1850. SCHAUUM, HERRMANN RUDOLPH. Bericht über Leistungen in der Entomologie für 1848. *Wieg. Archiv f. Naturg.*, 1850, p. 125.
Note on *Trochilium ceto* figured by Westwood (1848). Says "ist aber wahrscheinlich aus Nord America." [157]
1850. DOUBLEDAY, HENRY. A Synonymic List of British Lepidoptera, etc. London, 1850.
Mention of *Sesia* (= *Egeria*) *apiformis* and *Sesia tipuliformis*. [158]
1851. HARRIS, THADDEUS WILLIAM. Squash-vine Borer. *Amer. Agriculturist*, Vol. X, 1851, pp. 108, 109.
Characters, habits, and ravages of *Egeria cucurbitæ* (= *Melittia satyriniformis*). [159]
1851. SCHMIDT, H. RUDOLPH. Verzeichniss der Preussischen Schmetterlinge. Danzig, 1851.
Record (p. 8) of *Sesia* (= *Egeria*) *apiformis* and *Sesia tipuliformis* found in Prussia. [160]
1851. HEYDENREICH, GUSTAV HEINRICH. Verzeichniss der Europäischen Schmetterlinge. Leipzig, 1851, 3rd Edit.
Mention of *Sesia* (= *Egeria*) *apiformis* and *Sesia tipuliformis*. [161]
1851. HARRIS, THADDEUS WILLIAM. The Currant-tree Borer. *Mag. Hort., Hovey*, Vol. XVII, 1851, pp. 241-244.
Natural history of and means against *Egeria* (= *Sesia*) *tipuliformis*. [162]
1852. LEDERER, JULIUS. Versuch die Europäischen Lepidopteren in möglichst natürliche Reihenfolge zu stellen. *Verhand. Zool.-Bot. Ver.*, Wien, 1852, p. 67.
Mention of *Sesia* (= *Egeria*) *apiformis* and *Sesia tipuliformis*. [163]
1854. WESTWOOD, JOHN OBADIAH. Index Entomologicus, etc. London, 1854.
Figures of *Trochilium* (= *Egeria*) *apiformis* and *Egeria* (= *Sesia*) *tipuliformis*. [164]
1854. CZERNAY, ALEXANDER. Verzeichniss der Lepidopteren des Charkowschen, Potawschen und Ekaterinoslawschen Gouvernements. *Bull. Soc. Imp. Nat. Moscow*, Vol. XXVII, 1854.
Record of *Sesia* (*Trochilium*) *apiformis* found in Russia. [165]
1854. HARRIS, THADDEUS WILLIAM. Report on some of the Diseases and Insects affecting Fruit Trees and Vines. *Proc. Amer. Pomolog. Soc.*, 1854, pp. 197-210.
Habits and ravages of *Egeria* (= *Memythrus*) *polistiformis* and *Egeria* (= *Sanninoidea*) *exitiosa*. [166]
1854. STAUDINGER, OTTO. De Sesiis agri Berolinensis. Beroline, 1854.
Monograph of Sesiidæ found in the vicinity of Berlin. Description of *Trochilium* (= *Egeria*) *apiformis* and *Sesia tipuliformis*. Erects the genus *Sciapteron* (= *Memythrus*) for *Sphinx tabaniformis* Rottentburg. [167]

1854. WESTWOOD, JOHN OBADIAH. The American Oak-Gall Clear-winged Sphinx. *Gardener's Chronicle*, 1854, p. 757.
Original description of *Trochilium gallivorum* (= *Sesia scitula*). [168]
1854. EMMONS, EBENEZER. The Natural History of New York, etc. Vol. V, Albany, 1854.
Brief compiled account (p. 222) of *Ægeria* (= *Sanninoidea*) *exitiosa*, poor figures of male and female, larva, pupa, and cocoon (pl. xxvi, figs. 1-5). Short notice (p. 223) of oviposition and habits of *Ægeria* (= *Sesia*) *tipuliformis* and *Trochilium denudatum* (= *Memythrus asilipennis*). [169]
1855. GLOVER, TOWNEND. Insects Injurious and Beneficial to Vegetation. *Rep. Comm. Patents*, 1854 (1855), pp. 59-89, pl. 6.
General account of the life-history of *Ægeria* (= *Memythrus*) *polistiformis*; figures of male and female moths, larva, and cocoon. Account of *Ægeria* (= *Sanninoidea*) *exitiosa*. Records nectarine and apricot as food-plants for this species, and gives remedies, after Harris. [170]
1855. WESTWOOD, JOHN OBADIAH. Species of *Trochilium* and *Cynips* reared from American Galls. *Trans. Ent. Soc. London*, Vol. III, 2nd ser. 1855, p. 21.
Similar account of *Trochilium gallivorum* (= *Sesia scitula*) as in 1854. [171]
1855. FITCH, ASA. First Report on the Noxious, Beneficial, and other Insects of the State of New York. *Trans. New York State Agric. Soc.* 1854 (1855), pp. 812-820. (The first and second Reports were also issued under one cover with title and index, Albany, 1856, pp. 336, pl. 1-4, 37 figs.)
Lengthy and very good account of life-history and habits of *Trochilium exitiosum* (= *Sanninoidea exitiosa*). Gives detailed descriptions of egg, larva, pupa, and imago. [172]
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Brief accounts of *Trochilium* (= *Sesia*) *tipuliforme* (p. 423), *Trochilium* (= *Alcathoe*) *caudatum* (p. 424), *Trochilium* (= *Memythrus*) *polistiformis* (p. 387), and *Trochilium* (= *Sesia*) *pyri*. [178]
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Figure of *Trochilium* (= *Ægeria*) *apiformis* (pl. viii, fig. 30), without text. [186]
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Figure of *Trochilium apiformis*. No text. [190]
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Records negative or disastrous results with many of the methods there recommended against the ravages of the peach-borer (= *Sanninoidea exitiosa*). (Not seen.) [196]
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Brief popularly written account, with crude original figures of male and female, pupa and cocoon of *Ægeria* (= *Sanninoidea*) *exitiosa*. (Not seen.) [197]
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Mention (p. 16) of the species given by Harris (1839). Places them all in the genus *Trochilium*. [204]
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Records successful experiments with coal-tar, with a detailed account of use of Buchan's carbolic soap against ravages of peach-borer (= *Sanninoidea exitiosa*). (Not seen.) [209]
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Note on occurrence of *Sesia tipuliformis* in Bulgaria. [212]
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Accounts and figures of adults of *Ægeria* (*Sanninoidea*) *exitiosa* and *Sesia tipuliformis*; remedies. [214]

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Remedies against ravages of *Melittia cucurbitæ* (= *satyriniformis*). (Not seen.) [216]
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Habits, description, and means against *Ægeria* (= *Sesia*) *tipuliformis*. In answer to an inquiry. [217]
1867. GLOVER, TOWNEND. Entomological. Extracts from correspondence. *Month. Rep. Dept. Agricul.*, October, 1867, p. 329.
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1867. GAVERE, C. DE. Notices sur quelques Macrolépidoptères Indigènes. *Tijds. voor Ent. Neder. Ent. Vereen.*, 2nd Ser., Vol. II, 1867, p. 198.
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1868. BETHUNE, C. J. S. Notes on Canadian Lepidoptera. *Can. Ent.*, Vol. I, 1868, p. 18.
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1869. RILEY, C. V. *Prairie Farmer*, 1869, p. 57.
Brief note on *Trochilium* (= *Sesia*) *acerni* attacking soft maple. (Not seen.) [226]
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1869. PACKARD, ALPHEUS S. Entomological Calendar. *Amer. Naturalist*, Vol. II, 1869, p. 219.
Very brief note on *Trochilium* (*Sesia*) *tipuliforme*. [228]
1869. PACKARD, ALPHEUS S. Guide to the Study of Insects, etc. Salem, 1869.
Brief general descriptions and accounts (pp. 277-279) of the following species: *Ægeria* (*Sanninoidea*) *exitiosa*, figure of adults; *Ægeria* (= *Sesia*) *pyri*; *Ægeria* (= *Sesia*) *tipuliformis*, figures of larva, pupa and adult; *Ægeria quinquecaudata*, figure of male (= *Sannina uroceriformis*); and *Melittia cucurbitæ*, figure of adult (= *Melittia satyriniformis*). [229]
1869. SCUDDER, S. H. Entomological Correspondence of Thaddeus William Harris. Boston, 1869.
Mention of *Ægeria* (= *Alcathoë*) *caudata* (pp. 247 and 262). Descriptions of larva and cocoon of *Ægeria cucurbitæ* = *Melittia satyriniformis* (p. 284); *Ægeria persica* = *Sanninoidea exitiosa* (p. 359); and *Ægeria* (= *Sesia*) *pyri* (p. 361). Doubleday writes to Harris (p. 161) that *Ægeria cucurbitæ* (Harr.) is the same as *Melittia satyriniformis* and *Ægeria* (= *Sanninoidea*) *exitiosa* (Say) is the same as *Paranthrene epsidi forme* Hüb. [230]

1869. BOISDUVAL, JEAN ALPHONSE. *Lépidoptères de La Californie*. Bruxelles, 1869.
Contains original descriptions of *Sesia nomadæpennis* (p. 63), *S. chrysidipennis* and *S. bibionipennis* (p. 64). [231]
1869. WALSH and RILEY. Mounding Peach-trees. *Amer. Ent.*, Vol. I, 1869, pp. 180, 181, 201, and 222.
Very full discussion of the mounding system against ravages of the peach-borer (= *Sanninoidea exitiosa*). [232]
1869. WAKEFIELD, *Trans. Ent. Soc. London*, 1869 p. xvi.
Note on occurrence of *Trochilium* (= *Sesia*) *tipuliformis* in New Zealand. [233]
1869. FEREDAY, R. W. *Entomologists' Monthly Magazine*, Vol. VI, 1869, p. 116.
Note on occurrence of *Trochilium* (= *Sesia*) *tipuliformis* in New Zealand. [234]
1870. HEYLAERTS, F. J. M. *Tijds. Ent. Neder. Ent. Vereen.*, 2nd. Ser., Vol. V, 1870, p. 147.
Records *Trochilium* (= *Ægeria*) *apiformis* and *Sesia tipuliformis* from the vicinity of Breda. [235]
1870. RILEY, C. V. Second Annual Report on the Noxious, Beneficial, and other Insects of the State of Missouri, etc. *5th Ann. Rep. St. Bd. Agricul.*, 1869 (Mar. 1870), p. 64. Also separate, Jefferson City, Mo., Mar., 1870.
Brief account of *Ægeria cucurbitæ* (= *Melittia satyriniformis*). [236]
1870. FULTON, J. A. Peach Culture, 1870.
Brief account (pp. 120-125) of life-history of *Ægeria* (*Sanninoidea*) *exitiosa* with rather poor figures of male and female. Good discussion of methods against ravages of the insect. (Not seen.) [237]
1871. BOWLES, G. J. Quebec Currant Worms. *Can. Ent.*, Vol. III, 1871, p. 9.
Description and brief account of habits of *Ægeria* (= *Sesia*) *tipuliformis*. [238]
1871. CLIFFORD, J. R. S. Economy of *Sesia tipuliformis*. *Entomologist*, Vol. V, 1871, p. 460.
Note on habits of larva of *Sesia tipuliformis*. [239]
1871. RILEY, C. V. Third Annual Report of the Noxious, Beneficial, and other Insects of the State of Missouri, etc. *6th Ann. Rep. St. Bd. Agricul.*, for 1870 (April, 1871), p. 75.
Also separate, Jefferson City, Mo., 1871.
Characters and good general account of the life-history of *Ægeria* (= *Memythrus*) *polistiformis*. Figures of male and female. [240]
1871. SAUNDERS, WILLIAM. On the Larva of the Peach-borer. *Can. Ent.*, Vol. III, 1871, pp. 22-23, fig. 11.
Detailed description of larva of *Ægeria* (*Sanninoidea*) *exitiosa*, with brief notes on life-history and mode of oviposition. [241]
1871. TASCHENBERG, E. L. *Entomologie für Gärtner und Gartenfreunde*, 1871.
Brief account of *Sesia tipuliformis* (pp. 210-211). [242]
1872. SAUNDERS, WILLIAM. Insects Injurious to the Currant and Gooseberry. *Rep. Ent. Soc. Ontario*, 1871 (1872), p. 381.
Good general account of life-history of *Ægeria* (*Sesia*) *tipuliformis*. Figure of moth. [243]
1872. SAUNDERS, WILLIAM. Hints to Fruit Growers. *Can. Ent.*, Vol. IV, 1872, p. 133.
Brief account of *Ægeria* (*Sanninoidea*) *exitiosa* with figures of adults. [244]
1872. DUNLAP, H. J. *Trans. Illinois State Hort. Soc.*, 1872, p. 65.
Note on the injury done to maples by *Ægeria* (*Sesia*) *acerni* around Champaign, Illinois. (Not seen.) [245]
1872. WOOD, J. G. Insects at Home, etc. New York, 1872.
Popular account of *Sesia* (= *Ægeria*) *apiformis*, with figure (p. 426). [246]
1872. WALSH, BENJAMIN D. *Prairie Farmer*, Vol. XLIII, 1872, May 11.
Remedies against *Ægeria* (= *Sanninoidea*) *exitiosa*. (Not seen.) [247]
1872. WOCKE, M. *Zeits. für Ent.*, Breslau, 1872, p. 16.
Records occurrence of *Sesia tipuliformis* in Silesia, Germany. [248]
1872. FITZ, J. *Southern Apple and Peach Culturist*, 1872, pp. 254-260.
Fairly accurate account of life-history of *Ægeria* (*Sanninoidea*) *exitiosa*. Good discussion of mounding system, scalding, various washes, and other applications on soil around tree. (Not seen.) [249]

1872. LE BARON, W. *Prairie Farmer*, Vol. XLIII, May 11, 1872.
Remedies against *Ægeria* (= *Sanninoidea*) *exitiosa*. [250]
1872. REED, E. B. Insects Attacking the Cucumber, Melon, Pumpkin, and Squash Vines. *Rep. Ent. Soc. Ontario*, 1871 (1872), pp. 89-90.
General account of the life-history, habits, and ravages of *Ægeria cucurbitæ* (= *Melittia satyriniiformis*) in Canada. Poor figures of imago, larva, and cocoon. [251]
1872. LINTNER, J. A. Entomological Contributions. *23rd Ann. Rep. N. Y. St. Cab. Nat. Hist.*, 1869 (1872), p. 60.
Records of occurrence of *Trochilium* (= *Ægeria*) *tibiale*, *Ægeria* (= *Alcathoë*) *caudata*, *Ægeria* (= *Sesia*) *tipuliformis*, and *Trochilium* (= *Bembecia*) *marginata* in New York, with brief note on egg of the latter species. [252]
1873. BETHUNE, C. J. S. Grape-vine Borer. *Can. Ent.*, Vol. V, 1873, p. 218.
Note on ravages of *Ægeria* (= *Memythrus*) *polistiiformis* in North Carolina, quoted from Glover (1873). [253]
1873. REED, E. B. Insects Affecting the Peach. *Rep. Ent. Soc. Ontario*, 1872 (1873), pp. 44-47, figs. 34, 35.
Habits, life-history, and ravages of *Ægeria* (= *Sanninoidea*) *exitiosa*. [254]
1873. GLOVER, TOWNEND. *Month. Report Depart. Agr.*, October, 1873, p. 496.
Brief note on injury done to grape in North Carolina by *Ægeria* (= *Memythrus*) *polistiiformis*. [255]
1874. BOISDUVAL, JEAN ALPHONSE. *Histoire Naturelle des Insectes. Species Général des Lépidoptères Hétérocères. Suites à Buffon.* Paris, 1874.
Under the division Endophytides gives a diagnosis of the family Sesiidae and the tribe Sesiæ. Descriptions of all the known species of the family (pp. 381-479). Contains original descriptions of *Sesia anthracipennis* (p. 392) and *Sesia xiphieformis* (p. 409). Changes *Sannina uroceriformis* Walker (1856) to *Saunina uroceripennis* (p. 465). [257]
1874. TASCHENBERG, E. L. *Forstwissenschaftliche Insectenkunde oder Naturgeschichte der den Deutschen Forsten Schädlichen Insecten, etc.*, Leipzig, 1874.
General characters of the Sesiidæ and good account of *Trochilium* (= *Ægeria*) *apiformis* with figures of adult, larva, pupa, and section of tree (pp. 288-290, fig. 51). [258]
1874. GERMADIUS, P. A New *Ægerian* Maple Borer. *Am. Nat.*, Vol. VIII, 1874, p. 57.
Original description of *Trochilium acericolum* (= *Sesia acerni*) with notes on ravages of the larvæ. [259]
1874. RILEY, C. V. A New (?) *Ægerian* Maple Borer. *Am. Nat.*, Vol. VIII, 1874, p. 123.
Unites *Trochilium acericolum* Germadius (1874) with *Sesia acerni*. [260]
1874. RILEY, C. V. Sixth Report on the Noxious, Beneficial, and other Insects of the State of Missouri, etc. *9th Ann. Rep. St. Bd. Agricul.*, 1873 (1874). Also separate, Jefferson City, Mo., 1874.
Detailed account of the life-history and habits, with figures, of *Ægeria* (= *Sesia*) *acerni* (pp. 107-110). Original description of *Ægeria rubi* (= *Bembecia marginata*), with figures of adults (pp. 111-113). [261]
1874. BUTLER, A. G. Notes on the *Ægeriidæ* with Descriptions of New Genera and Species. *Ann. Mag. Nat. Hist.*, Vol. XIV, 1874, pp. 407-411.
States that *Ægeria pleciæformis* (= *Bembecia marginata*) and *Ægeria* (= *Gaea*) *emphytiiformis* appear to be better placed in the genus *Tarsa*. Wrongly considers *Sannina uroceriformis* the same as *Ægeria* (= *Sanninoidea*) *exitiosa*. [262]
1874. DUBOIS, CH. F. et ALPHONSE. *Les Lépidoptères de Belgique, leurs Chenilles et leurs Chrysalids.* Bruxelles, Leipzig, Gaud, Tom. I, 1874.
Figures of *Trochilium* (= *Ægeria*) *apiforme* (pl. cxi, fig. 1) and *Sesia tipuliformis* (pl. cxiii, fig. 2). [263]
1874. FREY, H., und WULLSCHLEGEL, J. *Mittheil. Schweiz Ent. Gesells.*, 1874, pp. 212 and 215.
Brief note on the habits and localities of *Trochilium* (= *Ægeria*) *apiforme* and *Sesia tipuliformis* in Switzerland. [264]
1874. GIRARD, M. *Les Metamorphoses des Insectes*, Paris, 1874.
Note on transformations of *Sesia* (= *Ægeria*) *apiformis* (p. 234). [265]
1874. GLOVER, TOWNEND. Report of the Entomologist and Curator of Insects. *Rep. Comm. Agricul.*, 1873 (1874).
Brief note on injury to grape in North Carolina by *Ægeria* (= *Memythrus*) *polistiiformis* (p. 159). [266]

1874. LINTNER, J. A. Entomological Contributions, III, 1874, p. 179.
Record of capture of *Ægeria* (= *Sesia*) *tipuliformis* in June. [267]
1875. COOK, A. J. Insects Injurious to the Farm, Garden, and Orchard. 13th Ann. Rep. St. Bd. Agri. Michigan, 1874 (1875).
Accounts of *Ægeria* (= *Sanninoidea*) *exitiosa* (pp. 136-137), *Ægeria* (= *Sesia*) *tipuliformis* (pp. 140-141), and *Melittia cucurbitæ* (= *satyriniformis*). [268]
1875. COOK, A. J. The Currant-borer. Count. Gent., Vol. XL, 1875, p. 438.
Characters, habits, and ravages of *Ægeria* (= *Sesia*) *tipuliformis*; remedies. (Not seen.) [269]
1876. BATEMAN, M. B. Count. Gent., 1876, p. 535.
Records fairly successful experiments with tarred paper, and good results with a carbolic acid soap, against ravages of *Sanninoidea exitiosa*. (Not seen.) [270]
1876. MÖSCHLER, H. B. Exotisches. Ent. Zeit. Stettin, Bd. XXXVII, 1876, p. 312.
Original description of *Grotea longipes* = *Podosesia syringæ*. [271]
1876. RILEY, C. V. Apple and Peach-borers. Coleman's Rural World, 1876, p. 11.
Brief account of habits and life-history of *Ægeria* (= *Sanninoidea*) *exitiosa*. (Not seen.) [272]
1877. GOTT, B. Report on Some of our Fruit Enemies. Rep. Ent. Soc. Ontario, 1877.
Very brief note (p. 42) on *Ægeria* (= *Sesia*) *tipuliformis*, with figure of adult. [273]
1877. PACKARD, ALPHEUS S. Report on the Rocky Mountain Locust and other Insects now or likely to injure Field and Garden Crops in the Western States and Territories. Rep. U. S. Geol. Sur. Terr. (Hayden), 1875 (1877).
Brief note on *Ægeria cucurbitæ* = *Melittia satyriniformis* (p. 769). [274]
1877. PACKARD, A. S. Half-Hours with Insects, Boston, 1877.
Note on mimicry of *Ægerians*. Mention and figure of *Ægeria* (= *Sesia*) *tipuliformis* (pp. 281-282). [275]
1877. PERKINS, G. H. On Certain Injurious Insects. 4th Rep. Vermont Bd. Agricul., 1877, pp. 146-152.
Note on *Ægeria rubi* (= *Bembecia marginata*) and account of *Ægeria* (= *Sesia*) *tipuliformis*. [276]
1878. HOFFMEISTER, A. W. Report on Noxious Insects of Small Fruits. Ann. Rep. Iowa St. Hort. Soc., 1877 (1878), p. 245.
Habits and ravages of *Ægeria* (= *Sesia*) *tipuliformis*. [277]
1878. LINTNER, J. A. A Squash-vine Borer. Cult. and Count. Gent., Vol. XLIII, 1878, p. 551.
Ravages, characters, and life-history of *Melittia cucurbitæ* (= *satyriniformis*). [278]
1878. GERHARD, BERNARD. Systematische Verzeichniss der Macro-Lepidopteren von Nord-America. Leipzig, 1878. [279]
1878. PERKINS, G. H. On Some of the Injurious Insects of Vermont. Fifth Rep. Vermont Bd. Agricul. 1878, pp. 261-263.
Account of *Ægeria* (= *Sesia*) *tipuliformis* with dates of appearance in Vermont. Figures of adult, larva, and pupa. Brief note on *Ægeria* (= *Memphyrus*) *polistiformis*. [280]
1878. THOMAS, CYRUS. Sixth Report Noxious and Beneficial Insects of the State of Illinois. The First Biennial Report by Cyrus Thomas. Trans. Dept. Agricul. Illinois, 1876 (1878).
Also separate, Springfield, Ill., 1877.
Descriptions and accounts of *Ægeria* (= *Sanninoidea*) *exitiosa* (p. 38), *Ægeria* (= *Sesia*) *tipuliformis* (p. 39), *Ægeria* (= *Sesia*) *pyri* (p. 40), *Ægeria* (= *Sesia*) *acerni* (p. 40), *Ægeria rubi* = *Bembecia marginata* (p. 40), and *Ægeria cucurbitæ* = *Melittia satyriniformis* (p. 41). [281]
1878. THOMAS, CYRUS. Seventh Report Noxious and Beneficial Insects of the State of Illinois. Second Annual Report by Cyrus Thomas. Trans. Dept. Agri. Illinois, 1877 (1878), n. s., Vol. VII.
Contains accounts of life-habits of the following, with remedies against their ravages: *Ægeria* (= *Sanninoidea*) *exitiosa* (pp. 169-170), *Ægeria* (= *Sesia*) *pyri* (pp. 170-171), *Ægeria* (= *Memphyrus*) *polistiformis* (p. 171), *Ægeria* (= *Alcathoë*) *caudata* (p. 172), *Ægeria* (= *Sesia*) *tipuliformis* (p. 172), *Ægeria cucurbitæ* = *Melittia satyriniformis* (p. 173), *Ægeria* (= *Sesia*) *acerni* (p. 173), *Ægeria* (= *Podosesia*) *syringæ* (p. 174), and *Ægeria rubi* = *Bembecia marginata* (p. 175). [282]

1879. BAILEY, J. S. The Natural History of *Ægeria pictipes* G. & R. *North Am., Ent.*, Vol. I, 1879, pp. 17-21. Plate.
Detailed account of life-history of *Ægeria* (= *Sesia*) *pictipes*, with figures. [283]
1879. FRENCH, G. H. Notes on Squash and Cucumber Pests. *Prairie Farmer*, March 1, 1879.
Note on *Melittia cucurbitæ* (= *satyriniformis*). [284]
1879. LINTNER, J. A. The Peach-tree Borer. *Cult. and Count. Gentl.*, Vol. XLIV, 1879, p. 199.
Gives remedies against ravages of *Ægeria* (= *Sanninoidea*) *exitiosa*. (Not seen.) [285]
1879. MILTON, M. *Count. Gentl.*, Vol. XLIV, 1879, p. 119.
Records *Ægeria* (= *Sanninoidea*) *exitiosa* in Azalea. (This is certainly an error.) (Not seen.) [286]
1879. MÖSCHLER, H. B. Amerikanisches. *Ent. Zeit. Stettin*, Bd. XL, 1879, p. 246.
Erects the genus *Podosesia* for *Ægeria syringæ* Harris (1839) and states that he redescribed this species as *Grolea longipes* (1876). [287]
1879. OSBORN, H. Ash-tree Borer. *College Quart.*, May, 1879, Vol. II, p. 10.
Note on *Podosesia syringæ* wrongly determined as *Trochilium denudatum*. Notice of parasite thereon. [288]
1879. OSBORN, H. Report on Noxious Insects. *Trans. Iowa St. Hort. Soc.*, 1878 (1879), Vol. XIII.
Habits and natural history of *Podosesia syringæ* wrongly determined as *Trochilium denudatum*. (Not seen.) [289]
1879. SMITH, EMILY ADELLA. Shade Trees, Indigenous Shrubs, and Vines, by J. T. Stewart, M.D., and Insects that Infest them, by Miss Emily A. Smith. Peoria, Illinois, 1877.
Note on *Ægeria* (= *Sesia*) *acerni* (p. 55). [290]
1879. STAUDINGER, OTTO. *Horæ Soc. Ent. Rossicæ*, Tom. XIV, 1878 (1879), p. 301.
Records *Trochilium* (= *Ægeria*) *apiforme* from Asia Minor. [291]
1880. COMSTOCK, J. H. Report of the Entomologist. *Ann. Report U. S. Comm. Agricul.*, 1879, 1880.
Description of egg, habits of young, larva, mode of oviposition of *Ægeria* (= *Sanninoidea*) *exitiosa*. Straw bandage recommended. Four parasites recorded (pp. 244-255). [292]
1880. EDWARDS, HY. Descriptions of Some New Forms of *Ægeridæ*. *Bull. Brooklyn Ent. Soc.*, Vol. III, 1880, pp. 71-72.
Original descriptions of *Melittia gloriosa*, *Sciapteron* (= *Memythrus*) *robinia*, and *Ægeria* (= *Sesia*) *aureopurpurea*. [293]
1880. FULLER, A. S. Peach-tree Borer Infesting Almonds. *Am. Ent.*, Vol. III, 1880.
Records *Ægeria* (= *Sanninoidea*) *exitiosa* infesting dwarf flowering almond shrubs. [294]
1880. FULLER, A. S. The Insect Enemies and Diseases of our Small Fruits. *Am. Ent.*, Vol. III, 1880, p. 93.
Brief note on habits of *Ægeria* (= *Sesia*) *tipuliformis*. [295]
1880. OSBORN, H. Ash-tree Borer. *Western Stock Fourn. and Farm*, Vol. X, August, 1880.
Characters and life-history of *Podosesia syringæ* wrongly determined as *Trochilium denudatum*. Figures of adult, larva, and pupa. [296]
1880. HULST, GEORGE D. Descriptions of Some New Species of North American Lepidoptera. *Bull. Brooklyn Ent. Soc.*, Vol. III, 1880, pp. 75-76.
Original descriptions of *Sesia nigella* (= *Sesia pyralidiformis*), *Sesia flavipes* (= *Bembecia marginata*), and *Sesia* (= *Albuna*) *rubescens*. [297]
1880. LINTNER, J. A. The Squash-borer. *Count. Gent.*, 1880, p. 455.
Ravages, characters of moth, mode of oviposition, and larval habits of *Ægeria cucurbitæ* (= *Melittia satyriniformis*). [298]
1880. OSBORN, H. Ash-tree Borer. *Coll. Quart.*, Vol. III, 1880, p. 33.
Character and life-history of *Podosesia syringæ* wrongly determined as *Trochilium denudatum*. Note on parasite thereon. Figures of larva, pupa, and adult. [299]
1880. OSBORN, H. Note. *Coll. Quart.*, Vol. III, 1880, p. 14.
Note on *Trochilium denudatum* (= *Podosesia syringæ*) destructive to ash-trees. (Not seen.) [300]

1880. RUTTER, J. Culture and Diseases of the Peach, 1880.
Brief account (pp. 74-76) of *Ægeria* (= *Sanninoidea*) *exitiosa*, with good discussion of combating. [301]
1880. SAUNDERS, W. Notes on Various Insects. *Rep. Ent. Soc. Ontario*, 1879, 1880, p. 76.
Brief note on habits and ravages of *Ægeria* (= *Sesia*) *tipuliformis*. [302]
1880. STOUT, O. E. Insects Injurious and Beneficial. *Rep. Kansas St. Hort. Soc.*, 1879, 1880, Vol. IX, p. 88.
Notes on *Ægeria* (= *Sesia*) *pyri*, *Ægeria* (= *Memythrus*) *polistiformis*, and *Ægeria* (= *Sanninoidea*) *exitiosa*. (Not seen.) [303]
1880. TASCHENBERG, E. L. Praktische Insektenkunde oder Naturgeschichte aller Derjenigen Insekten mit welchen wir in Deutschland nach den bisherigen Erfahrungen in nähere Berührung Kommen Können, etc. Dritter Theil. Die Schmetterlinge. Bremen, 1880.
Good account of life-history and habits of *Sesia* (= *Ægeria*) *apiiformis*, with figures of adult, larva, pupa, and section of trees showing work of larva. [304]
1881. BELL and REED. The Maple-tree Borer. *Can. Ent.*, Vol. XIII, 1881, p. 236.
Note on recurrence and ravages of *Ægeria* (= *Sesia*) *acerni* in London, Canada. [305]
1881. DRUCE, H. Biologia Centrali-Americana, Vol. I, Heterocera, 1881, p. 32.
Records *Melittia satyriniformis* and *M. ceto* from Mexico and Central America. Also record of *Ægeria* (= *Sesia*) *geliformis*. [306]
1881. EDWARDS, HENRY. New Genera and Species of the Family Ægeridæ. *Papilio*, Vol. I, pp. 179-208.
Original descriptions of *Trochilium* (= *Ægeria*) *pacificum* (p. 180), *Euhagena nebraskæ* (p. 180); *Bembecia* (= *Vespanima*) *sequoia*, *Bembecia superba* = *Vespanima sequoia* (p. 181); *Larunda solitudo* (p. 182); *Sciapteron* (= *Sanninoidea*) *græfii*, *Sciapteron* (= *Memythrus*) *scepsiformis*, *Sciapteron* (= *Memythrus*) *cupressi* (p. 182); *Carmenta* (gen. nov.) with *Ægeria pyralidiformis* as the type, *Carmenta* (= *Sesia*) *ruficornis* (p. 184); *Carmenta minuta* (= *Sesia ruficornis*), *Carmenta* (= *Sesia*) *sanborni* and *Carmenta* (= *Parharmonia*) *fraxini* (p. 185); *Albuna* (gen. nov.) with *Ægeria hylotomiformis* Walker as the type, *Albuna* (= *Sesia*) *resplendens*, *Albuna* (= *Sesia*) *rutilans* (p. 186); *Albuna* (= *Sesia*) *rileyana* and *Albuna* (= *Sesia*) *artemisiæ* (187); *Albuna montana*, *Albuna tanaceti* and *vancouverensis* = *pyramidalis* (p. 188); *Albuna coloradensis*, *Albuna torva* = *coloradensis* and *Ægeria flava* from Panama (p. 189); *Ægeria* (= *Sesia*) *saxifragæ* and *Ægeria* (= *Sesia*) *verecunda* (p. 190); *Ægeria brunneipennis* = *Sesia rileyana*, *Ægeria* (= *Sesia*) *rubrofascia*, and *Ægeria bolli* = *Sesia bassiformis* (p. 191); *Ægeria lupini* and *Ægeria perplexa* = *Sesia rutilans* (p. 192); *Ægeria impropria* = *Sesia rutilans*, *Ægeria sexfasciata* = *Sesia bassiformis*, *Ægeria* (= *Sesia*) *corusca* (p. 193); *Ægeria aureola* = *Sesia rutilans*, *Ægeria consimilis*, and *Ægeria infirma* = *Sesia bassiformis* (p. 195), *Ægeria* (= *Sesia*) *morula*, *Ægeria koebelei* = *Sesia pyri* (p. 196); *Ægeria washingtonia* = *Sesia rutilans*, *Ægeria* (= *Sesia*) *decipiens*, and *Ægeria* (= *Sesia*) *neglecta* (p. 197); *Ægeria imperfecta* and *Ægeria hemizonia* = *Sesia rutilans*, *Ægeria* (= *Sesia*) *senecioides* (p. 198); *Ægeria* (= *Sesia*) *refulgens*, *Ægeria* (= *Sanninoidea*) *opalescens*, and *Ægeria* (= *Sesia*) *novaroensis* (p. 199); *Ægeria* (= *Sesia*) *gilæ* and *Ægeria* (= *Sesia*) *mimuli* (p. 200); *Ægeria* (= *Sesia*) *madariæ* and *Ægeria* (= *Sesia*) *albicornis*; *Ægeria proxima* = *Sesia albicornis*, and *Ægeria inusitata* = *Sesia pictipes* (p. 201); *Ægeria nicotianæ* = *Sesia decipiens*, *Pyrrhotænia* = *Sesia polygoni* and *Pyrrhotænia* (= *Sesia*) *fragariæ* (p. 202); *Pyrrhotænia helianthi* = *Sesia fragariæ*, *Pyrrhotænia* (= *Sesia*) *achillæ*, *Pyrrhotænia* (= *Sesia*) *tepperi*, and *Pyrrhotænia eremocarpi* = *Sesia achillæ* (p. 203); *Pyrrhotænia meadii* = *Sesia polygoni*, *Pyrrhotænia orthocarpi* = *Sesia fragariæ* and *Pyrrhotænia* (= *Sesia*) *texana* (p. 204); *Zenodoxus* (= *Paranthrene*) *heucheræ*, *Zenodoxus potentillæ* = *Paranthrene heucheræ* and *Zenodoxus* (= *Paranthrene*) *canescens* (p. 205); also contains description of larva of *Sciapteron* (= *Memythrus*) *Podosesia* *syringæ* (p. 184). The second part of the paper contains descriptions of Ægeriidæ described by Walker (1856). [307]
1881. FRENCH, G. H. A Parasite on *Ægeria syringæ* Harr. *Papilio*, Vol. I, 1881, p. 106.
Records a parasite, *Phæogenes ater*, on *Ægeria* (= *Podosesia*) *syringæ*. [308]
1881. GROTE, A. R. A New Species of N. American Ægeriadæ. *Bull. Brooklyn Ent. Soc.*, Vol. III, 1881, pp. 78-79.
Original descriptions of *Trochilium* (= *Memythrus*) *simulans*. [309]

1881. GROTE, A. R. North American Moths, with a Preliminary Catalogue of the Species of *Hadena* and *Polia*. *Bull. U. S. Geol. and Geograph. Surv. Terr.* (Hayden), Vol. VI, 1881, p. 257.
Same description of *Trochilium* (= *Memythrus*) *simulans* as in the preceding title; also brief note on similarity of sexes of *Ægeria* (= *Sesia*) *pictipes*. [310]
1881. KELLICOTT, D. S. Observations on Several Species of *Ægeriæ* Inhabiting the Vicinity of Buffalo, N. Y. *Can. Ent.*, Vol. XIII, 1881, pp. 3-8.
Good description of moth, larva and pupa of *Ægeria* (= *Memythrus*) *tricincta* (pp. 3-5). Original description of *Ægeria* (*Parharmonia*) *pini*, with accounts of larva, pupa, habits, and time of appearance (pp. 5-6). Records of *Ægeria* (= *Sesia*) *pictipes* infesting wild cherry and wild black cherry; pupa and larva in June and July (p. 7). Note on pupa, larval habits and time of appearance of *Ægeria* (= *Sesia*) *acerni* (p. 7). Abundance of *Ægeria* (= *Sanninoidea*) *exitiosa* and *Ægeria* (= *Sesia*) *tipuliformis* (p. 7). Supposes pupa found in ash to be *Trochilium denudatum* (= *Memythrus asilipennis*). [311]
1881. KELLICOTT, D. S. Notes on *Ægeria pini*. *Can. Ent.*, Vol. XIII, 1881, p. 157.
Detailed description of adult of *Ægeria* (= *Parharmonia*) *pini*, with brief notes on habits. [312]
1881. MARTEN, JOHN. Tenth Report of the State Entomologist on Noxious and Beneficial Insects of the State of Illinois. *Trans. Dept. Agric. Illinois*, 1880 (1881). Also separate, Springfield, Illinois, 1881.
Notes on, and descriptions of the larvæ of *Ægeriæ* (= *Sesiidæ*) found in Illinois. *Ægeria* (= *Sanninoidea*) *exitiosa*, *Ægeria cucurbitæ* (= *Melittia*) *satyriniformis*, *Ægeria* (= *Sesia*) *tipuliformis*, *Ægeria* (= *Sesia*) *pyri* (p. 107); *Ægeria* (= *Sesia*) *acerni*, *Ægeria rubi* = *Bembecia marginata*, *Ægeria* (= *Memythrus*) *polistiformis*, *Ægeria* (= *Alcathoe*) *caudata* (p. 108); *Ægeria* (= *Podosesia*) *syringæ*, *Ægeria* (= *Sesia*) *pictipes*, *Ægeria* (= *Memythrus*) *asilipennis* (p. 109); also *Ægeria anthracipennis* and *Ægeria tiliæ* Harris (?= *Ægeria tibialis*). [313]
1881. OSBORN, H. The Ash-tree Borer. *Trans. Iowa Hort. Soc.*, 1880 (1881), Vol. XV, pp. 107-110.
Account of *Podosesia syringæ*, wrongly determined as *Trochilium denudatum*. Notes on habits, destructive qualities, larva, and parasite thereon. Figures of adult, larva and pupa. (Not seen.) [314]
1881. PACKARD, ALPHEUS S. Insects Injurious to Forest and Shade Trees. *Bull. No. 7, U. S. Ent. Com.*, Washington, 1881.
Contains compiled account of habits and food-plants of the following *Sesiidæ*: *Sciapteron* (= *Memythrus*) *robinæ* (pp. 103 and 261), *Ægeria* (= *Sesia*) *acerni* (pp. 106-107), *Ægeria* (= *Memythrus*) *tricincta* (p. 121), *Ægeria tibiale* (p. 123), *Ægeria* (= *Parharmonia*) *pini* (p. 180), *Ægeria denudatum* = *Memythrus asilipennis* (p. 138), *Bembecia* (= *Vespa*) *sequoia*, *Sciapteron* (= *Podosesia*) *syringæ* and *Bembecia marginata* (p. 261). [315]
1881. RILEY, C. V. Lepidopterological Notes. *Amer. Naturalist*, Vol. XV, 1881, p. 751.
Critical note on pupa of *Ægeria* (= *Sesia*) *acerni*, in answer to remarks by Kellicott (1881). [316]
1881. SAUNDERS, WILLIAM. Entomology for Beginners. The Legged Maple Borer—*Ægeria acerni*. *Can. Ent.*, Vol. XIII, 1881, p. 69-70.
Compiled account of *Ægeria* (= *Sesia*) *acerni* with Riley's figures. [317]
1881. STRECKER, H. Description of a New Species of *Trochilium*. *Can. Ent.*, Vol. XIII, 1881, p. 156.
Original description of *Trochilium* (= *Melittia*) *grande*. [318]
1881. ZIMMERMAN, C. D. Insects Injurious to Nursery Stock and Best Methods of Destroying them. *Gardener's Monthly*, Vol. XXIII, 1881, p. 238.
Discusses *Ægeria* (= *Sanninoidea*) *exitiosa* in nursery stock. Mounding the best methods in a nursery. [319]
1882. ANON. *Count. Gentl.*, Vol. XLVII, 1882, p. 373.
Decline in profitable peach culture due to the borer (= *Sanninoidea exitiosa*) and not to climate. Successful with "digging-out" process. (Not seen.) [320]
1882. COLEMAN, N. *Papilio*, Vol. II, 1882, p. 50.
States that the larva of *Melittia cucurbitæ* (= *M. satyriniformis*) hibernates, and does not transform to the pupa state until spring. [321]

1882. EDWARDS, HY. Notes on North American *Ægeriadae*, with Descriptions of New Forms. *Papilio*, Vol. II, 1882, pp. 52-57.
States that *Bembecia marginata* has been redescribed by Mr. Riley as *Trochilium rubi* and by Mr. Hulst as *Sesia flavipes* (p. 52). Erects the genus *Alcathoe* for *Trochilium caudatum* Harris (1839); describes the female of *Trochilium* (= *Ægeria*) *tibiale* Harris and states that *Trochilium* (= *Podosesia*) *syringæ* has been redescribed as *Grotea longipes* by Möschler (p. 53). Original descriptions of *Melittia snowii* and *M. amena* = *satyriniformis* (p. 53). Erects the genus *Harmonia* (= *Parharmonia*) with *Ægeria pini* as the type (p. 54). Original description of *Harmonia morrisoni* (= *Parharmonia fraxini*), *Albuna* (= *Memythrus*) *denotata*, *Ægeria* (= *Sanninoidea*) *exitiosa* var. *fitchii* (p. 55); *Ægeria* (= *Sesia*) *tecta*, *Ægeria henshawii* (= *Sesia saxifragæ*). Erects the genus *Sospita* for *Ægeria quinquecaudata* (= *Sannina uroceriformis*), brief note on *Ægeria* (= *Sesia*) *tipuliformis* and erroneously records the European *Sesia asiliformis* (= *Sesia sigmoidea*) from Massachusetts (p. 56). [322]
1882. EDWARDS, HENRY. Further Notes and Descriptions of some North American *Ægeriadae*. *Papilio*, Vol. II, 1882, pp. 96-99.
States that *Trochilium gallivorum* Westwood (= *Sesia scitula*) has been omitted from our lists and gives description of the species, quoting Westwood (p. 96); changes the preoccupied name *Sospita* Hy. Edwards (1882) to *Phemone* and erects the genus *Fatua*, with *Trochilium denudatum* Harris (= *Memythrus*) *asilipennis* as the type (p. 97). Original descriptions of *Ægeria* (= *Sesia*) *præstans*, *Ægeria* (= *Sesia*) *querci* (p. 98) and *Ægeria* (= *Sesia*) *prosopis* (p. 99). [323]
1882. GROTE, A. R. New Check List of North American Moths. New York, May, 1882.
List of *Ægeriadae* based upon previously recorded facts (pp. 11-12). [324]
1882. HULST, GEORGE D. *Sesia syringæ* Harr. *Bull. Brooklyn Ent. Soc.*, Vol. V, 1882, p. 17.
Very good account of life-history of *Sesia* (= *Podosesia*) *syringæ* based upon original observations. Figures of adult, larva and anatomy. [325]
1882. KELLICOTT, D. S. *Bull. Buffalo Soc. Nat. Sci.*, Vol. IV, 1882, p. 62.
Brief notes on larval characters of *Ægeria* (= *Memythrus*) *tricincta*. [326]
1882. KELLICOTT, D. S. Notes on *Ægeria pini*. *Can. Ent.*, Vol. XIII, 1882, p. 157.
Revision of the original description of *Ægeria* (= *Parharmonia*) *pini*. [327]
1882. OSBORN, H. Insects of the Forest—*Ægeria syringæ*—Ash Borer. *Iowa State Leader*, 1882.
Ravages and life-history of *Ægeria* (= *Podosesia*) *syringæ*. (Not seen.) [328]
1882. SAUNDERS, WILLIAM. Popular Papers on Entomology. *Rep. Ent. Soc. Ontario*, 1881 (1882), p. 20.
Compiled account of *Ægeria* (= *Sesia*) *acerni*. [329]
1882. TREAT, MARY. Injurious Insects of the Farm and Garden. New York, 1882.
Brief account of *Ægeria* (= *Sanninoidea*) *exitiosa*. Figures of adults. [330]
1883. ANON. Check List of Insects of the Dominion of Canada. July, 1883.
Record of the following species: *Trochilium* (= *Ægeria*) *tibiale*, *Sciapteron* (= *Memythrus*) *robinæ*, *Bembecia marginata*, *Podosesia syringæ*, *Albuna pyramidalis*, *A. vancouverensis*, *A. montana*, *Sannina* (= *Sanninoidea*) *exitiosa*, *Ægeria hemizonæ* (= *Sesia rutilans*), *Ægeria* (= *Sesia*) *acerni*, *Ægeria* (= *Sesia*) *tipuliformis* and *Ægeria* (= *Sesia*) *neglecta*. [331]
1883. DEVEREAUX, W. L. The Squash Borer, *Ægeria cucurbitæ* (*Melittia ceto*). *Rural New Yorker*, Vol. XLII, 1883, p. 425.
Notes on *Melittia cucurbitæ* (= *M. satyriniformis*). [332]
1883. EDWARDS, HENRY. New Species of *Ægeriadae*. *Papilio*, Vol. III, 1883, pp. 155-157.
Original descriptions of *Sciapteron* (= *Palmia*) *præcedens*, *Ægeria* (= *Sesia*) *bolteri*, *Ægeria æmula* (= *Sesia scitula*), *Pyrrhotænia wittfeldii* (= *Sesia texana*), *Pyrrhotænia* (= *Sesia*) *subærea*, *Pyrrhotænia* (= *Sesia*) *animosa*, and *Melittia bergii* from Buenos Ayres, S. A. Description of *Ægeria* (= *Sesia*) *geliformis* Walker (1856), and records *Melittia ceto* (= *satyriniformis*) from Buenos Ayres, S. A. [333]
1883. HULST, GEORGE D. Notes on Some Sesiidæ. *Bull. Brooklyn Ent. Soc.*, Vol. VI, 1883, pp. 8-10.
Excellent account of life-history and habits of *Bembecia marginata*, based upon original observation, and quotations from Riley, Saunders, and Harris. Wrongly quotes Riley's (6th Mo. Rep.) account of the oviposition of *Oberia perspicillata* as that of *Bembecia marginata*. Original description of *Bembecia marginata* var. *albicoma*. States that *Ægeria* (= *Sesia*) *acerni* flies at night and emerges from pupa before sunrise. Note on time of appearance of *Melittia cucurbitæ* (= *satyriniformis*) on Long Island; mode of oviposition and ravages. [334]

1883. LINTNER, J. A. A New Sexual Character in the Pupa of some Lepidoptera. *Psyche*, Vol. IV, 1883, p. 106.
Points out a distinguishing characteristic of the male pupa of *Ægeria* (= *Sanninoidea*) *exitiosa* and *Ægeria* (= *Sesia*) *tipuliformis*. [335]
1883. RILEY, C. V. Stoddart's Encyclopedia Americana, 1883, pp. 137, 138.
Notes on *Ægeria* (= *Sanninoidea*) *exitiosa* and *Ægeria* (= *Sesia*) *tipuliformis*. [336]
1883. RILEY, C. V. Entomological Notes. *Amer. Nat.*, Vol. XVII, 1883, p. 782.
Critical remarks on Hulst's paper on *Bembecia marginata* (1883). States that Hulst falls into singular error in quoting the account of the oviposition of *Oberca perspicillata* (6th Mo. Rep. 1874) and mistaking it for *Bembecia*. Says that the eggs of this species, laid in the vicinity of St. Louis, Mo., hatch in fall. [337]
1883. RIVERS, J. J. *Ægeria hemizonæ* Hy. Edw. *Papilio*, Vol. III, 1883, p. 26.
Records *Ægeria hemizonæ* (= *Sesia rutilans*) as living in the roots or in base of canes of raspberry in California. [338]
1883. SAUNDERS, WILLIAM. Insects Injurious to Fruits. Philadelphia, 1883.
General accounts of the following Sesiidæ: *Ægeria* (= *Sesia*) *pyri* (p. 140); *Ægeria* (= *Sanninoidea*) *exitiosa*, with figures of adults and larva (pp. 191-195); *Ægeria* (= *Memythrus*) *polistiformis*, with figures of adults, larva, and cocoon (pp. 229-231); *Ægeria rubi* (= *Bembecia marginata*), with figures of adults (pp. 303, 304); *Ægeria* (= *Sesia*) *tipuliformis*, with figures of adult, larva, and pupa (pp. 336, 337), and *Ægeria cucurbitæ* (= *Melittia satyriniformis*), with figure of adults, larva, and cocoon (pp. 361, 362). [339]
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Brief account of *Ægeria* (= *Sesia*) *acerni*. [340]
1884. BREHM, A. E. Allgemeine Kunde des Tierleben, Insecten. Bd. I, Th. IV, Leipzig, 1884.
Popular account of *Trochilium* (*Ægeria*) *apiforme*, with figures (p. 375). [341]
1884. FERNALD, C. H. Standard Natural History. Edited by B. John Kingsley. Vol. II, Crustacea and Insects. Boston, 1884.
Popular diagnosis of family Ægeriidae (= Sesiidae) and brief accounts of *Sannina* (= *Sanninoidea*) *exitiosa*, *Ægeria* (= *Sesia*) *pictipes*, and *Ægeria* (= *Sesia*) *tipuliformis*. [342]
1884. FYLES, T. W. *Can. Ent.*, Vol. XVI, 1884, p. 220.
Record of *Ægeria* (= *Memythrus*) *tricincta* taken at Como, Canada. [343]
1884. LINTNER, J. A. Squash-vine Borer. *Count. Gent.*, Vol. XLIX, 1884, pp. 477, 497, and 517.
Characters, life-history, and ravages of *Melittia cucurbitæ* (= *M. satyriniformis*). [344]
1884. REED, E. B. *Can. Ent.*, Vol. XVI, 1884, p. 220.
Records abundance of *Ægeria* (= *Sesia*) *acerni* in the neighborhood of London, Canada. [345]
1884. SAUNDERS, WILLIAM. *Rep. Ent. Soc. of Ontario*, 1883 (1884), p. 12.
Brief account of *Ægeria* (= *Sesia*) *acerni*. [346]
1885. LINTNER, J. A. Second Annual Report on the Injurious and other Insects of the State of New York. Albany, 1885.
Remedies against the ravages of *Ægeria* (= *Sanninoidea*) *exitiosa* (pp. 6, 24-26). Life-history and habits of *Melittia cucurbitæ* (= *M. satyriniformis*) with figures of adult, larva, and pupa (pp. 57-68). Brief diagnosis of family Ægeriidae (= Sesiidae) with figures of adult, larva, and pupa of *Ægeria* (= *Sesia*) *tipuliformis* (p. 60). Sexual characters of male pupæ of *Ægeria* (= *Sanninoidea*) *exitiosa* and *Ægeria* (= *Sesia*) *tipuliformis*. [347]
1885. FYLES, T. W. *Rep. Ent. Soc. Ontario* (1884), 1885, p. 24.
Record of *Ægeria* (= *Memythrus*) *tricincta* taken at Como, Canada. [348]
1885. REED, E. B. *Rep. Ent. Soc. Ontario* (1884), 1885, p. 24.
Records abundance of *Ægeria* (= *Sesia*) *acerni* in the neighborhood of London, Canada. [349]
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Brief accounts of *Sesia* (= *Ægeria*) *apiiformis* and *Sesia tipuliformis*. [350]

1886. LINTNER, J. A. Insects and other Pests. *New England Homestead*, Vol. XX, 1886, p. 198.
Note on *Bembecia marginata*. (Not seen.) [351]
1886. WEED, C. M. The Current Stem Borer. *Prairie Farmer*, Vol. I.VII, 1886, p. 233.
Notes on the life-history, habits, and means against ravages of *Ægeria* (= *Sesia*) *tipuliformis*. (Not seen.) [352]
1886. WILCOX, Peach Culture, 1886.
Brief account (pp. 43-45) of *Ægeria* (= *Sanninoidea*) *exitiosa*, with discussion on "mounding system." (Not seen.) [353]
1887. BUCKLER, WM. Larvæ of British Butterflies and Moths, Vol. II, 1887.
Figures of larvæ of *Sphecia* (= *Ægeria*) *apiformis* and *Trochilium* (= *Sesia*) *tipuliformis*, (pp. 49, 123, and 128, pl. xxvii, fig. 1). [354]
1887. DORAN, E. W. Report on the Economic Entomology of Tennessee. *Bien. Rep. Com. Agricul. Tennessee*, 1887, p. 207.
Notes on *Ægeria* (= *Sanninoidea*) *exitiosa* and *Melittia cucurbitæ* (= *M. satyriniformis*). [355]
1887. HARRINGTON, W. H. Insects Infesting Maple-trees. *Rep. Ent. Soc. Ontario*, 1887, p. 24.
Very brief note on *Ægeria* (= *Sesia*) *acerni*. [356]
1887. HOFFMANN, ERNST. Die Grossschmetterlinge Europas. Stuttgart, 1887.
Good diagnosis of genera *Trochilium* (= *Ægeria*), *Sesia*, and *Bembecia*. Brief descriptions of *T.* (= *Ægeria*) *apiforme* and *Sesia tipuliformis*, with colored figures (pp. 28-29, pl. xiv, figs. 7 and 15). [357]
1887. HUGUENIN. *Mittheil. der Schweiz. Ent. Gesells.*, Bd. VII, 1887, p. 318.
Records *Trochilium* (= *Ægeria*) *apiforme* and *Sesia tipuliformis* from Switzerland. [358]
1887. RILEY, C. V. Strawberry Borers. *Pacific Rural Press*, Vol. XXXIII, 1887, p. 559.
Remedies against *Ægeria impropria* (= *Sesia rutilans*). (Not seen.) [359]
1887. WEBSTER, F. M. Insects of the Year. *Trans. Indiana Hort. Soc.*, 1886 (1887).
Note on *Ægeria* (= *Sesia*) *tipuliformis*. (Not seen.) [360]
1888. ASHMEAD, W. H. *Bulletin No. 2, Agric. Exper. Station of Florida*, 1888, pp. 17-19.
Brief discussion of life-history of *Ægeria* (= *Sanninoidea*) *exitiosa*. (Not seen.) [361]
1888. BARRY, P. The Fruit Garden, 1888, p. 488.
Good brief account of *Ægeria* (= *Sanninoidea*) *exitiosa*. (Not seen.) [362]
1888. BETHUNE, C. J. S. Remedies for Noxious Insects. *18th Ann. Rep. Ent. Soc. Ontario*, 1887 (1888), p. 54.
Brief account of life-history of *Ægeria* (= *Sesia*) *tipuliformis*, with figures of adult, larva and pupa. [363]
1888. CROSSMAN, S. *Bull. No. 3, Agri. Exper. Station of Arkansas*, 1888, pp. 3-5.
Brief account of habits of *Ægeria* (*Sanninoidea*) *exitiosa* and remedies. (Not seen.) [364]
1888. EDWARDS, HENRY. Catalogue of Species of the Higher Families of the North American Heterocera, Described since Grote's New Check List (1882), with those omitted from that Publication. *Ent. Amer.*, Vol. III, 1888, pp. 221-232.
Contains list of species not in Grote's Catalogue (1882). [365]
1888. HALE, J. H. *Trans. Massachusetts Hort. Soc.*, 1888, Pt. I, p. 66.
Recommends Hale's wash against ravages of peach borer (= *Sanninoidea exitiosa*). (Not seen.) [366]
1888. H. F. H. *Country Gentleman*, Vol. LIII, p. 149.
Records time of flight of *Ægeria* (= *Sanninoidea*) *exitiosa* in Kentucky. From June to October, but mostly from July 15th to August 15th. Mounding system most practical remedy. [367]
1888. KLEE, W. G. Report of the State Inspector of Fruit Pests. *Third Biennial Rep. State Board of Hort. California*, 1888, pp. 242-258.
Treats on *Ægeria impropria* (= *Sesia rutilans*) and *Sannina pacifica* (= *S. opalescens*). (Not seen.) [368]
1888. KENT, G. H. Some Notes from Mississippi. *Insect Life*, Vol. I, 1888, p. 17.
Note on the ravages of *Melittia cucurbitæ* (= *M. satyriniformis*) in Mississippi. [369]
1888. LINTNER, J. A. Egg-laying of Peach Borer Moth. *Cult. and Count. Gent.*, Vol. LIII, 1888, p. 109.
Note on oviposition of *Sannina* (= *Sanninoidea*) *exitiosa*, in New Jersey. [370]

1888. LINTNER, J. A. Injurious Fruit Insects of the Vicinity of New York. *Proc. N. Y. Farmers*, 1886-87 (1888), pp. 52-59.
Notice of and means against *Sannina* (= *Sanninoidea*) *exitiosa*. [371]
1888. LINTNER, J. A. Fourth Report on the Injurious and other Insects of the State of New York. Albany, 1888.
Brief account (p. 138) of habits of larva of *Melittia cucurbitæ* (= *M. satyriniformis*). [372]
1888. RILEY, C. V. Notes on the Life-habits of *Ægeriidæ*. *Proc. Ent. Soc. Washington*, Vol. I, 1888, p. 85.
Records food-plants of *Melittia gloriosa*, *Sciapteron* (= *Memythrus*) *robinia*, *Phenonoë 5-caudata* (= *Sannia uroceriformis*), *Ægeria* (= *Sesia*) *pyri*, *Ægeria impropria* (= *Sesia rutilans*), and *Ægeria* (= *Sesia*) *albicornis*. [373]
1888. RIVERS, J. J. Note upon *Ægeria impropria* and a Description of the Female. *Ent. Am.*, Vol. IV, 1888.
Records (p. 99) breeding *Ægeria impropria* (= *Sesia rutilans*) from blackberry. Detailed description of female moth. [374]
1889. COOPER, E., and LELONG, B.M. Insecticides Approved by the State Board of Horticulture. *Pacific Rural Press*, 1889, p. 146.
Remedies for *Sannina* (= *Sanninoidea*) *pacifica*. (Not seen.) [375]
1889. CORDLEY, A. B. *Orchard and Garden*, 1889, p. 211.
Note on *Ægeria* (= *Sanninoidea*) *exitiosa*. (Not seen.) [376]
1889. FRENCH, G. H. On some Texas and California Moths. *Can. Ent.*, Vol. XXI, 1889, p. 163.
Briefly describes as new *Ægeria pinorum* Behrens MS. (= *Vespa minima sequoia*), and gives larval habits. [377]
1889. HILLMAN, F. H. *Orchard and Garden*, 1889, p. 179.
Note on *Ægeria* (= *Sesia*) *tipuliformis*. (Not seen.) [378]
1889. KLEE, W. G. *Proc. Tenth Fruit-Growers' Convention*, 1889, p. 14.
Note on *Sanninoidea pacifica* (= *opalescens*). (Not seen.) [379]
1889. LINTNER, J. A. Peach-tree Borer. *Country Gentleman*, Vol. LIV, 1889, p. 861.
Good account of *Ægeria* (= *Sanninoidea*) *exitiosa*, time of appearance, life-history, and remedy. Poor figures of male and female. (Not seen.) [380]
1889. RILEY, C. V., and HOWARD, L. O. *Sciapteron* in Cottonwood in Washington Territory. *Insect Life*, Vol. II, 1889, p. 18.
Brief note on *Sciapteron* (= *Memythrus*) *robinia* infesting cottonwood. [381]
1889. SAUNDERS, W. Insects Injurious to Fruits. Philadelphia, 2d Edit., 1889.
Same accounts of Sesiidæ as in the first edition. [382]
1889. TOWNSEND, C. H. T. Some Michigan Notes Recorded. *Insect Life*, Vol. II, 1889, p. 42.
Note on ravages of *Ægeria* (= *Sanninoidea*) *exitiosa* and *Ægeria* (= *Sesia*) *tipuliformis* in Michigan. [383]
1889. WEED, C. M. *Amer. Nat.*, Vol. XXIII, 1889, p. 1108.
Gives a general account of family *Ægeriidæ* (= Sesiidæ) with plate containing figures of the following species (after Kellicott): *Sannina* (= *Sanninoidea*) *exitiosa*, *Ægeria* (= *Sesia*) *pyri*, *Ægeria* (= *Sesia*) *tipuliformis*, *Ægeria* (= *Sesia*) *acerni*, *Ægeria* (= *Sesia*) *lustrans*, and *Ægeria* (= *Sesia*) *pictipes*. [384]
1890. ALWOOD, W. B. Peach Borers. *Southern Planter*, 1890, pp. 565-566.
Account of *Sannina* (= *Sanninoidea*) *exitiosa*. (Not seen.) [385]
1890. BEUTENMÜLLER, WILLIAM. Catalogue of the Lepidoptera Found within Fifty Miles of New York City, with their Food-plants. *Ann. N. Y. Acad. Sci.*, Vol. V, 1890, pp. 204-205.
Records the following species of *Ægeriidæ* (= Sesiidæ): *Melittia celo* (= *M. satyriniformis*), *Alcathoë caudatum*, *Trochilium* (= *Ægeria*) *apiformis*, *Bembecia marginata*, *Sciapteron* (= *Memythrus*) *polistiformis*, *Fatua denudata* (= *Memythrus asilipennis*), *Podosesia syringæ*, *Sannina* (= *Sanninoidea*) *exitiosa*, *Ægeria* (= *Sesia*) *pictipes*, *Æ.* (= *Sesia*) *pyri*, *Æ.* (= *Sesia*) *acerni*, *Æ.* (= *Sesia*) *tipuliformis*, *Æ. eupatori* and *Æ. infirma* (= *Sesia lustrans*), *Æ.* (= *Sesia*) *albicornis*, and *Carmenta* (= *Sesia*) *pyralidiformis*. [386]
1890. KELLICOTT, D. S. Blackberry Borer. *Journ. Columbus Hort. Soc.*, 1890, p. 27.
Notes on *Bembecia marginata*. [387]

1890. KELLICOTT, D. S. On Injurious *Ægerians*. *Journ. Columbus Hort. Soc.*, Vol. V, 1890, pp. 11-17, pl. i.
Accounts and figures of the following species: *Sannina* (= *Sanninoidea*) *exitiosa*, *Ægeria* (= *Sesia*) *pyri*, *Ægeria* (= *Sesia*) *tipuliformis*, *Ægeria* (= *Sesia*) *acerni*, *Ægeria* (= *Sesia*) *lustrans*, and *Ægeria* (= *Sesia*) *pictipes*. [388]
1890. KENT, G. H. Notes of the Season from Mississippi. *Insect Life*, Vol. II, 1890, p. 283.
Records injury done to squashes by *Melittia ceto* (= *M. satyriniformis*) in Mississippi. [389]
1890. LUGGER, O. Insects Injurious to Small Fruit. *Rep. Minn. State Hort. Soc.*, 1890, p. 169.
Account of *Ægeria* (= *Sesia*) *tipuliformis*. [390]
1890. MARTEN, J. Maple Borers. *Prairie Farmer*, April 5, 1890.
Contains note on *Ægeria* (= *Sesia*) *acerni*. [391]
1890. OSBORN, H. Entomology. *Orange Judd Farmer*, 1890, p. 261.
Contains note on *Ægeria* (= *Sesia*) *acerni*. (Not seen.) [392]
1890. PACKARD, A. S. Insects Injurious to Forest and Shade Trees. *Fifth Rep. U. S. Ent. Com.*, Washington, 1890.
Contains life-histories and food-habits of the following species: *Sciapteron* (= *Memythrus*) *robinæ* (p. 360), *Ægeria* (= *Memythrus*) *tricincta* (p. 444), *Ægeria tibiale* (p. 473), *Fatua denudata* = *Memythrus asilipennis* (pp. 540 and 623), *Podosesia syringæ* (p. 542), *Sesia hospes* = *Sesia scitula* (p. 596), *Harmonia* (= *Parharmonia*) *pini* (pp. 727-730), *Ægeria* (= *Sesia*) *acerni* (p. 731), *Ægeria pinorum* = *Vespa minima sequoiæ* (p. 384), *Ægeria* (= *Sanninoidea*) *exitiosa* (p. 521), and *Bembecia* (= *Vespa minima*) *sequoiæ* (pp. 733 and 922). [393]
1890. RILEY, C. V., and HOWARD, L. O. Maple-tree Borers. *Insect Life*, Vol. III, 1890, p. 161.
Remarks on *Ægeria* (= *Sesia*) *acerni* in reply to inquiry. [394]
1890. SMITH, JOHN B. Catalogue of Insects Found in New Jersey. Trenton, 1890.
Records twelve species of Sesiidæ from New Jersey (pp. 288-289). [395]
1890. SMITH, JOHN B. Report of the Entomologist. *10th Ann. Rep. New Jersey Agric. Exp. St.*, 1889 (1890), pp. 299-302.
Brief account of life-history of *Sannina* (= *Sanninoidea*) *exitiosa*. [396]
1890. WILEY, CHARLES A. Abundance of *Ægeriidæ*. *Insect Life*, Vol. II, 1890, p. 251.
Note on abundance of *Ægeria* (= *Sesia*) *acerni* in Detroit, Michigan. [397]
1891. BRUNER, L. Some Insects of Especial Interest to the Fruit-growers of Nebraska. *Rep. Nebraska State Hort. Soc.*, 1891, pp. 151-266.
Account of *Ægeria rubi* (= *Bembecia marginata*), *Ægeria* (= *Sesia*) *acerni*, *Ægeria* (= *Sesia*) *tipuliformis*, and *Ægeria* (= *Sanninoidea*) *exitiosa*. (Not seen.) [398]
1891. COOK, A. J. Currant Borers. *Proc. Michigan Hort. Soc.*, 1890 (1891), pp. 106-110.
Notes on *Ægeria* (= *Sesia*) *tipuliformis*. [399]
1891. COQUILLET, D. W., and RILEY, C. V. The California Peach-tree Borer. *Insect Life*, Vol. III, 1891, pp. 392-393.
Records injury done to peach trees by *Sannina pacifica* (= *Sanninoidea opalescens*) and gives remedies. Riley points out distinguishing characters of the adult, larva, and pupa. [400]
1891. DAVIS, G. C. Notes on a few Borers. *Insect Life*, Vol. IV, 1891, pp. 64-67.
Records rearing *Ægeria* (*Memythrus*) *tricincta* from galls of *Saperda concolor* on willow. Brief description of cocoon. [401]
1891. EDWARDS, HY. *Psyche*, Vol. VI, 1891, p. 108.
See article by Lugger (1891). Original description of *Trochilium luggeri* (= *Memythrus simulans*). [402]
1891. GILLETTE, C. P. A few Injurious Insects and their Remedies. *Trans. Iowa State Hort. Soc.*, 1890 (1891), p. 104.
Note on *Sannina* (= *Sanninoidea*) *exitiosa*. (Not seen.) [403]
1891. JACK, J. G. A Clematis Borer. *Garden and Forest*, Vol. IV, 1891, p. 496, fig. 77.
Good and original account of the life-history and habits of *Alcathoë caudata*, with figures of male and female, pupa, and section of plant showing the ravages of the larva. [404]

1891. KELLICOTT, D. S. Report of Committee on Entomology. *Journ. Columbus Hort. Soc.*, 1891, p. 100.
Note on *Melittia ceto* (= *M. satyriniformis*). (Not seen.) [405]
1891. KELLICOTT, D. S. Entomology. *Jour. Columbus Hort. Soc.*, 1891, pp. 60-62.
Notes on *Ægeria* (= *Sesia*) *acerni*, *Ægeria hospes* (= *Sesia scitula*), and *Podosesia syringæ*. [406]
1891. KELLICOTT, D. S. Notes on Two Borers Injurious to the Mountain-ash. *Can. Ent.*, Vol. XXIII, 1891, p. 250.
Records the mountain-ash as a food-plant of *Podosesia syringæ*, with notes on oviposition and time of appearance of the insect in Ohio. [407]
1891. KENT, G. H. Notes from Mississippi. *Insect Life*, Vol. III, 1891, p. 337.
Records *Melittia ceto* (= *M. satyriniformis*) as being very destructive to squash, cucumber, and cashaw vines. [408]
1891. LINTNER, J. A. The Peach-tree Borer. *Country Gentleman*, Vol. LVI, 1891, p. 457.
Good discussion of methods of controlling *Ægeria* (= *Sanninoidea*) *exitiosa*. Figures of male and female adults after Kellicott (1890), and reproduces Emmons's (1854) poor figures. [409]
1891. LITTLE, S. A. *Rural New Yorker*, 1891, p. 593.
Popular account of *Ægeria* (= *Sanninoidea*) *exitiosa*. [410]
1891. LUGGER, OTTO. Two New Lepidopterous Borers. *Psyche*, Vol. VI, 1891, pp. 108, 109, pl. iii.
Contains original description of *Trochilium luggeri* Hy. Edwards (1891) (= *Memythrus*) *simulans*, and original description of *Trochilium* (= *Podosesia*) *fraxini* by Lugger. [411]
1891. MURTFELDT, M. E. Outlines of Entomology. *Ann. Rep. State Hort. Soc. Missouri*, 1890 (1891), p. 85.
Brief account of *Ægeria* (= *Sanninoidea*) *exitiosa* with figures. [412]
1891. MCCARTHY, GERALD. Some Injurious Insects. *Bull. No. 78, North Carolina Agric. St.*, 1891, p. 27.
Brief account of *Sannina* (= *Sanninoidea*) *exitiosa*. [413]
1891. NEUMOEGEN, BERTHOLD. Some New and Beautiful *Ægeriadae*. *Entomological News*, Vol. II, 1891, pp. 107-109.
Original descriptions of *Trochilium californicum* (= *Ægeria pacifica*), *T. minimum* (= *Ægeria tibialis*), *Larunda* (= *Paranthrene*) *palmii* and *Albuna vitrina* (= *Sesia gilvæ*). [414]
1891. ORCUTT, I. H., and ALDRICH, J. M. Injurious Insects. *Bull. No. 22, South Dakota Agric. Exp. St.*, 1891, pp. 80-83.
Good account of *Ægeria* (= *Podosesia*) *fraxini*, with remedies and preventives against its ravages. [415]
1891. OSBORN, H. Entomology. *Orange Judd Farmer*, 1891, p. 340.
Notes on *Sesia tipuliformis*. [416]
1891. RILEY, C. V., and HOWARD, L. O. A Clematis Root Borer. *Insect Life*, Vol. IV, 1891, p. 219.
Account of *Alcalthoë caudata* (wrongly spelled *Acalthoë cordata*) with figures copied from Jack (1891). [417]
1891. SMITH, JOHN B. Report of the Entomologist. *11th Ann. Rep. New Jersey Agric. Ex. St.*, 1890 (1891).
Good account of *Melittia ceto* (= *M. satyriniformis*), giving life-history, habits, time of appearance, mode of oviposition, and describes egg (pp. 476-480). [418]
1891. SMITH, JOHN B. Insects Injurious to the Blackberry. *Bull. N. New Jersey Agric. Exp. St.*, Nov. 30, 1891.
Very good account (pp. 9-12) of *Bembecia marginata*, partly based upon original observations. Figures male and female adults after Riley, and original figures of larva and pupa. [419]
1891. SMITH, JOHN B. List of Lepidoptera of Boreal America. Philadelphia, 1891.
List of Sesiidæ based upon work done by Hy. Edwards, with a few additional species, described by other authors (pp. 19-21). [420]

1891. SMITH, JOHN B. Notes on Blackberry Borers and Gall Maker. *Insect Life*, Vol. IV, 1891, pp. 27-30.
Brief account of *Bembecia marginata*. States that the eggs are laid late in August and in September and hatch the same fall. The larvæ are found the following spring in canes of previous year's growth and leave the same in July to attack new shoots. [421]
1891. SMITH, JOHN B. The Squash Borer. *Melittia cucurbitæ*, and Remedies Therefor. *Insect Life*, Vol. IV, 1891, pp. 30, 31.
Notes on the mode of oviposition of *Melittia cucurbitæ* (= *M. satyriniformis*). Describes egg, habits of larva, and gives remedies against its ravages. [422]
1891. SMITH, JOHN B. Notes of the Year in New Jersey. *Insect Life*, Vol. IV, 1891, p. 43.
Brief note on remedy against the ravages of *Sannina* (= *Sanninoidea*) *exitiosa*. [423]
1891. SNYDER, R. *Country Gentleman*, Vol. IV, 1891, p. 677.
Very sensible article on washes and similar applications against ravages of *Sanninoidea exitiosa*. "Digging-out" method described. (Not seen.) [424]
1891. TOWNSEND, C. H. T. A Preliminary Account of some Insects Injurious to Fruits. *Bull. No. 3, New Mexico Agric. Exp. St.*, 1891, pp. 13-15.
Brief account of *Sannina* (= *Sanninoidea*) *exitiosa*. [425]
1891. WEED, C. M. Insects Injuriously Affecting Fruits, Shade Trees, and Flowers. *Ann. Rep. Columbus Hort. Soc.*, 1890 (1891), p. 166.
Brief compiled account of *Sannina* (= *Sanninoidea*) *exitiosa*. (Not seen.) [426]
1891. WEED, C. M. Insects and Insecticides. Hanover, N. H., 1891, pp. 77-79.
Brief account of *Sannina* (= *Sanninoidea*) *exitiosa* with Kellicott's (1890) figures. [427]
1891. WEED, H. E. Injurious Insects. *Bull. No. 14, Mississippi Agric. Exp. St.*, 1891, pp. 17-18.
Brief compiled account of *Sannina* (= *Sanninoidea*) *exitiosa* with Kellicott's (1890) figures. [428]
1891. WEED, H. E. Work of the Season in Mississippi. *Insect Life*, Vol. IV, 1891, p. 34.
Records the abundance of *Ægeria* (= *Sesia*) *pyri* in apple, but not in pear. [429]
1891. WOODWARD, J. S. *Rural New Yorker*, 1891, p. 736.
Remedies against *Sanninoidea exitiosa*. Formula for soap, milk, and cement wash. Ashes are dangerous. (Not seen.) [430]
1892. BEUTENMÜLLER, WILLIAM. List of Types of Lepidoptera in the Edwards Collection of Insects. *Bull. Amer. Mus. Nat. Hist.*, Vol. IV, 1892, pp. 171-175.
List of 72 species of types of *Ægeriidae* (= *Sesiidae*). [431]
1892. DRUCE, HERBERT. Description of a New Genus and some New Species of Heterocera from Central America. *Ann. Mag. Nat. Hist.*, Vol. IX, 1892, p. 276.
Original description of *Melittia beckeri* (= *M. grandis*?). [432]
1892. GILLETTE, C. P. Observations upon Injurious Insects. *Bull. No. 19, Colorado Agric. Exp. St.*, 1892, p. 21.
Account of habits of *Sesia tipuliformis* in Colorado. [433]
1892. GILLETTE, C. P. Injurious Insects and their Remedies. *Proc. State Bd. Hort. Colorado*, 1892, pp. 230-241.
Account of *Sesia tipuliformis* in Colorado. (Not seen.) [434]
1892. JACK, J. G. Notes on Two Troublesome Borers. *Garden and Forest*, 1892, p. 426.
Notes on oviposition of *Ægeria rubi* (= *Bembecia marginata*), flight of moth, habits of larvæ, and time of appearances. Remedies against ravages. [435]
1892. KELLICOTT, D. S. Notes on the *Ægeriidae* of Central Ohio.—I. *Can. Ent.*, Vol. XXIV, 1892, pp. 42-47; *Insect Life*, Vol. IV, 1892, pp. 81-85.
Brief notes on habits of the following species: *Melittia ceto* (= *M. satyriniformis*), *Alcathoe caudatum*, *Bembecia marginata*, *Podosesia syringæ*, *Sannina* (= *Sanninoidea*) *exitiosa*, *Ægeria gallivora* (= *Sesia scitula*), *Ægeria* (= *Sesia*) *pictipes*, *Ægeria* (= *Sesia*) *acerni*, *Ægeria* (= *Sesia*) *tipuliformis*, *Ægeria lustrans* (= *Sesia bassiformis*), *Ægeria* (= *Sesia*) *corni*, and *Carmenta* (= *Sesia*) *pyralidiformis*. Original description of *Albuna modesta* (= *Sesia albicornis*). [436]

1892. KELLICOTT, D. S. Notes on the *Ægeriadae* of Central Ohio.—II. *Can. Ent.*, Vol. XXIV, 1892, pp. 209-212.
Detailed account of life-history and habits of *Ægeria* (= *Sesia*) *corni*. Attempts to prove that the *Melittia ceto* (= *M. satyriniformis*) is double brooded in Ohio. Notes on habits of *Sciapteron* (= *Memythrus*) *tricincta*, and original description of *Ægeria* (= *Sesia*) *rubristigma*. [437]
1892. KELLOGG, V. L. Common Injurious Insects of Kansas. Lawrence, Kansas, 1892.
Brief account of *Sannina* (= *Sanninoidea*) *exitiosa*. Records it as appearing as early as April in Kansas and as having been in the State as early as 1873 (pp. 91-92). (Not seen.) [438]
1892. RILEY, C. V., and HOWARD, L. O. A Sesiid Pest of the Persimmon. *Insect Life*, Vol. IV, 1892, p. 332.
Records *Phemone* *5-caudata* (= *Sannina uroceriformis*) infesting the roots of the persimmon, and gives remedies against ravages of the insect. [439]
1892. SMITH, JOHN B. Notes on *Melittia ceto* Westw. *Can. Ent.*, Vol. XXIV, 1892, p. 129.
Discussion as to whether *Melittia ceto* (= *M. satyriniformis*) is single or double brooded, and gives reasons for his belief that the species is single brooded in New Jersey and northward. [440]
1892. SMITH, JOHN B. Notes on Blackberry Borers and Gall Maker. *22d Rep. Ent. Soc. Ontario*, for 1891 (1892), pp. 52-54.
Same as 1891 account of *Bembecia marginata*. [441]
1892. SMITH, JOHN B. The Squash Borer, *Melittia cucurbitæ*, and Remedies Therefor. *22d Rep. Ent. Soc. Ontario*, 1891 (1892), p. 55.
Same as 1891 account of *Melittia cucurbitæ* (= *M. satyriniformis*). [442]
1892. SMITH, JOHN B. Notes of the Year in New Jersey. *22d Rep. Ent. Soc. Ontario*, 1891 (1892), p. 65.
Same as 1891 account of *Sannina* (= *Sanninoidea*) *exitiosa*, but with figures of adults. [443]
1892. SMITH, JOHN B. Report of the Entomologist. *12th Ann. Rep. New Jersey State Agric. St.*, 1891 (1892).
Good account of life-history of *Bembecia marginata* (pp. 378-381). Detailed account of *Melittia ceto* (= *M. satyriniformis*), time of appearance and mode of oviposition. Single brooded in New Jersey. Remedies against its ravages (pp. 385-394). [444]
1892. SMITH, JOHN B. *Insect Life*, Vol. V, 1892, p. 85.
Note on the occurrence of *Melittia ceto* (= *M. satyriniformis*) on Long Island, N. Y. [445]
1892. STANDFUSS, M. Neue Formen der Macrolepidopteren us dem Alpengebiet. *Mitth. Schweiz. Ent. Gesells.*, Bd. VIII, 1892, p. 369.
Original description of *Trochilium* (= *Ægeria*) *apiforme* var. *caflischii*. [446]
1892. STEINERT, HERMANN. Die Macrolepidopteren der Dresdener Gegend. *Deutsche Ent. Zeitschrift, Iris, Dresden*, Bd. V, 1892, pp. 399 and 401.
Notes on habits of *Trochilium* (= *Ægeria*) *apiforme* and *Sesia tipuliformis*. [447]
1892. TOWNSEND, C. H. T. The Possible and Actual Influence of Irrigation on Insect Injury in New Mexico. *Insect Life*, Vol. V, 1892, p. 79.
Brief note on habits of *Sannina* (= *Sanninoidea*) *exitiosa*. States that the larvæ do not seem to be affected by irrigation. [448]
1892. WALKER, JAMES. Treatment of the Squash Borer. *Insect Life*, Vol. IV, 1892, pp. 271, 272.
Good account of oviposition of *Melittia cucurbitæ* (= *M. satyriniformis*) and habits of moth and time of appearance on Long Island, N. Y. Remedies against its ravages. [449]
1892. WEED, H. E. Work of the Season in Mississippi. *22d Rep. Ent. Soc. Ontario*, 1891 (1892), p. 58.
Same as 1891 account of *Ægeria* (= *Sesia*) *pyri*. [450]
1893. BEUTENMÜLLER, WILLIAM. Notes on some North American Moths, with Descriptions of New Species. *Bull. Amer. Mus. Nat. Hist.*, Vol. V, 1893, pp. 22-26.
Unites *Tarsa bombyciiformis* with *Fatua denudata* (= *Memythrus asilipennis*) and *Ægeria odyneripennis* with *Bembecia marginata* (p. 22). Notes on *Bembecia marginata* var. *albicoma*, *Bembecia pleciæformis* (= *B. marginata*), *Bembecia* (= *Gaea*) *emphytiiformis*, and *Albuna hylotomiiformis* (p. 23). Places *Albuna denotata* in the genus *Sciapteron* (= *Memythrus*); notes on *Sannina uroceriformis*, *Ægeria* (= *Sesia*) *bassiformis*,

- and unites *Ægeria* (= *Sesia*) *madariæ* with *Ægeria* (= *Sesia*) *lupini* (p. 24). Unites *Ægeria* (= *Sesia*) *inutilata* with *Ægeria* (= *Sesia*) *pictipes* and *Ægeria* *sexfasciata*, *Ægeria* *consimilis*, *Ægeria* *eupatorii*, and *Ægeria* *infrma* with *Ægeria* *lustrans* (= *Sesia* *bassiformis*); original description of *Pyrrhotania coloradensis* (= *Euhagena nebraskæ*) (p. 25). Unites *Pyrrhotania wittfeldii* with *Pyrrhotania* (= *Sesia*) *texana*, *Pyrrhotania elda* with *P.* (= *Sesia*) *behrensi*, and *P.* (= *Sesia*) *helianthi* with *P.* (= *Sesia*) *fragariæ* (p. 26). [451]
1893. CARADJA, ARISTIDES VON. Beitrag zur Kenntniss der Gross-Schmetterlinge des Departement de la Haute-Garonne. *Deutsche Ent. Zeitschrift, Iris, Dresden*, Bd. VI, 1893, pp. 189 and 190.
Record of the occurrence of *Trochilium* (= *Ægeria*) *apiforme* and *Sesia* *tipuliformis* in the department of Haute-Garonne, France. [452]
1893. GIBB, LACHLAN. Notes on Collecting some of the smaller Sesiidæ in the London (England) District. *Can. Ent.*, Vol. XXV, 1893, p. 177.
Records taking the imago of *Sesia* *tipuliformis* about 10 A.M. and again at about 4 P.M. States that the larvæ feed in two-year-old wood. [453]
1893. HOFFMANN, ERNST. Die Raupen der Gross-Schmetterlinge Europas, Stuttgart, 1893.
Characters of the larvæ of Sesiidæ (p. 31). Descriptions (p. 32) and colored figures of egg (pl. 1, fig. 21), larva, and pupa (pl. ix, fig. 5) of *Trochilium* (= *Ægeria*) *apiforme*. Description (p. 32) and colored figure of larva of *Sesia* *tipuliformis*. [454]
1893. JUDEICH, J. F., and NITSCHKE, H. Lehrbuch der Mitteleuropäischen Forstinsectenkunde, etc. III. Abtheilung, Wien, 1893.
General account of Sesiidæ, their transformations and habits (p. 759-60). Description and good account of life-history and habits of *Trochilium* (= *Ægeria*) *apiformis* (p. 761-62). [455]
1893. KANE, W. F. DE VISMES. Catalogue of the Lepidoptera of Ireland. *Entomologist*, Vol. XXVI, 1893, p. 272.
Records *Trochilium* (= *Ægeria*) *apiformis* and *Sesia* *tipuliformis* from Ireland. [455a]
1893. LINTNER, J. A. Eighth Report on Injurious and other Insects of the State of New York, Albany, 1893.
Detailed account of remedies against ravages of *Sannina* (= *Sanninoidea*) *exitiosa*, with figures of male and female moths, after Kellicott (1890), and also poor figures from Emmons (1854). [456]
1893. MACCARTHY, GERALD. *Bull. No. 92, North Carolina Agric. Exper. St.*, 1893, pp. 104-105.
Brief account of habits of *Sannina* (= *Sanninoidea*) *exitiosa*, with discussion of methods for combating. [457]
1893. RIESEN, A. *Ent. Zeitung Stettin*, Bd. LIV, 1893, pp. 29-30.
Note on the mimicry of *Trochilium* (= *Ægeria*) *apiformis*. [458]
1893. SMITH, JOHN B. Report of the Entomologist. *13th Ann. Rep. New Jersey State Agric. St.*, 1892 (1893).
Good detailed account of the life-history and habits of *Melittia ceto* (= *M. satyriniformis*), pp. 499-512. Brief note on habits of *Bembecia marginata*, p. 459. [459]
1893. SMITH, JOHN B. Insects Injurious to Cucurbs. *Bull. No. 94, New Jersey Agric. Exp. St.*, July 2d, 1893, pp. 27-40.
Same account of *M. ceto* as the preceding. [460]
1893. WEBSTER, F. M. Insects Reared from Black Knot. *Ent. News*, Vol. IV, 1893, p. 295.
Records raising *Sesia* *pictipes* from black knot on cherry and plum. [461]
1893. WEBSTER, F. M. Insects Affecting the Blackberry and Raspberry. *Bull. No. 45, Ohio Agric. Exp. St.*, 1893, p. 159.
Good compiled account of life-history and habits of *Bembecia marginata*, with figures of male, female, larva, and pupa. [462]
1894. BEUTENMÜLLER, WILLIAM. Studies of Some Species of North American Moths. *Bull. Am. Mus. Nat. Hist.*, Vol. VI, 1894, pp. 87-98.
Unites *Bembecia superba* with *B. sequoiæ* and proposes the genus *Vespa mima* for this species. Places *Sciapteron admirandus* in the genus *Tirista* and *Trochilium fraxini* in the genus *Podosesia*. States that

- the genus *Harmonia* is preoccupied and proposes *Parharmonia* instead. Unites *Carmenta fraxini* with *H. morrisonii* and places the same in the genus *Parharmonia*. Unites *Albuna vancouverensis* with *A. pyramidalis*, *A. tanacetii* with *A. montana*, *A. torva* with *A. coloradensis*, and places all as varieties of *A. pyramidalis*, also *A. rubescens*. Unites *Ægeria perplexa*, *Æ. impropria*, and *Æ. washingtonia* with *Æ. (= Sesia) lupini*. Unites *Æ. henshawi* with *Æ. (= Sesia) saxifraga*, *Æ. proxima* with *Æ. (= Sesia) albicornis*, *Æ. bollii* with *Æ. (= Sesia) lustrans*. Original descriptions of *Ægeria (= Sesia) edwardsii*, *Æ. deceptiva (= Sesia giliæ)*. Records *Æ. (= Sesia) culiciformis (= S. americana)* from British Columbia. Unites *Ægeria aureola* and *Æ. hemizonæ* with *Æ. (= Sesia) rutilans*, and *Trochilium hospes* and *T. gal-livorum* with *Ægeria (= Sesia) scitula*. Note on *Ægeria (= Sesia) rubristigma*. Unites *Pyrrhotænia meadii* with *P. (= Sesia) polygoni*, *P. helianthi* and *P. orthocarpi* with *P. (= Sesia) fragariae*. Original description of *Carmenta (= Sesia) nigra* and translations of descriptions of the species described by Boisdual (1874). [463]
1894. BEUTENMÜLLER, WILLIAM. On North American Moths with Description of a New Species of *Triprocris*. *Bull. Am. Mus. Nat. Hist.*, Vol. VI, 1894, pp. 365-368.
Unites *Trochilium californicum* with *T. (= Ægeria) pacificum*, and *T. minimum* with *T. (= Ægeria) tibiale*. Transfers *Fatua palmii* to genus *Sciapteron (= Memythrus)*. Unites *Sannina pacifica* with *Ægeria (= Sanninoidea) opalescens*, *Ægeria (= Sesia) imperfecta* with *Ægeria (= Sesia) decipiens*, and erroneously unites *Albuna vitrina* with *Albuna pyramidalis*. [464]
1894. BRUNER, I. Insect Enemies of the Apple-tree and its Fruit. *Ann. Rep. Nebraska State Hort. Soc.*, 1894, pp. 154-223.
Account of *Sesia acerni*. (Not seen.) [465]
1894. CARR, W. T. *The Entomologist*, Vol. XXVII, 1894, p. 234.
Records *Sesia (= Ægeria) apiformis* from Lincolnshire, England. [466]
1894. HARRISON, W. *The Entomologist*, Vol. XXVII, 1894, p. 358.
Brief note on the larva of *Trochilium (= Ægeria) apiformis*. [467]
1894. JACK, J. G. Notes on some Injurious Insects. *Trans. Massachusetts Hort. Soc.*, 1894, pp. 133-150.
Notes on *Ægeria (= Sanninoidea) exitiosa*. (Not seen.) [468]
1894. LINTNER, J. A. Maple-tree Borer. *Gardening*, 1894, p. 56.
Note on *Ægeria (= Sesia) acerni*. (Not seen.) [469]
1894. NEUMOEGER, BERTHOLD. Some Beautiful New Forms of North American Ægeriidæ. *Ent. News*, Vol. V, 1894, pp. 330-331.
Original descriptions of *Sciapteron (= Memythrus) dollii*, *S. seminole*, *Alcathoe caudata* var. *walkeri*, and *Sannina (= Sanninoidea) exitiosa* var. *luminosa*. [470]
1894. RILEY, C. V., and HOWARD, L. O. Persimmon Root Borer. *Insect Life*, Vol. VI, 1894, p. 327.
Record of *Phemonoe 5-caudata (= Sannina uroceriformis)* boring in roots of persimmon in Delaware and Kansas. [471]
1894. RILEY, C. V. Notes from Sunbury. *Insect Life*, Vol. VI, 1894, p. 206.
States that *Trochilium (= Podosesia) syringæ* passes from the egg to the adult in Washington, D. C., in at least three months. [472]
1894. SIRKINE, F. A. Some Insects Injurious to Squash, Melon, and Cucumber-vines. II. The Asparagus Beetle. *Bull. No. 75, New York Agric. Exp. St.*, 1894.
Notes on *Melittia cucurbitæ (= M. satyriniformis)*. [473]
1894. WEED, H. E. The Peach-tree Borer. *Southern Cultivator*, November, 1894.
Note on the peach borer, *Sannina (= Sanninoidea) exitiosa*. (Not seen.) [474]
1895. COMSTOCK, J. H. A Manual for the Study of Insects. Ithaca, 1895.
General characters of Sesiidæ with figure of venation (p. 259). Condensed account of *Sannina (= Sanninoidea) exitiosa* with figure of female (p. 260). Brief notes on *Sannina pacifica (= Sanninoidea opalescens)*, *Sesia tipuliformis*, *Harmonia (= Parharmonia) pini* (p. 261), and *Melittia ceto (= M. satyriniformis)* with figure of larva in stem of squash (p. 262). [475]
1895. COOK, A. J. The California Prune Weevil; the Peach Borer. *Rural Californian*, 1895, p. 436.
Notes on *Sannina pacifica (= Sanninoidea opalescens)*. (Not seen.) [476]

1895. DAVIS, G. C. Borers that the Horticulturists must Fight. *Proc. Mich. Hort. Soc.*, 1894 (1895), pp. 78-83.
Notes on *Sannina* (= *Sanninoidea*) *exitiosa* and *Sciapteron* (= *Memythrus*) *polistiformis*. [477]
1895. DAVIS, G. C. *Bull. No. 121, Agric. Exp. St. Michigan*, 1895, pp. 31-32.
Brief account of *Sannina* (= *Sanninoidea*) *exitiosa*. (Not seen.) [478]
1895. LUGGER, OTTO. Insects Injurious in 1895. *Bull. No. 43, Minnesota Agric. Exp. St.*, 1895.
Detailed account of *Sesia tipuliformis* with remedies against ravages (pp. 184-187) and figures of moth, larva, and section of stalk with pupa protruding (pl. v, fig. 45). Brief account of *Sesia acerni* with figures of various stages of development (p. 188). Specific characters of imago of *Trochilium* (*Podosesia*) *fraxini* (p. 196) with figure of adult. Specific characters and habits of *Trochilium luggeri* (= *Memythrus simulans*) (p. 189), and record of capture of *Memythrus asilipennis* in Minnesota (p. 192, pl. iii, fig. 5). [479]
1895. MACCARTHY, GERALD. *Bull. No. 20, Agric. Exp. St. No. Carolina*, 1895, pp. 292-293.
Brief account of *Sannina* (= *Sanninoidea*) *exitiosa*. [480]
1895. MEYRICK, EDWARD. Handbook of British Lepidoptera. London, 1895.
Detailed diagnosis of the *Ægeriadae* (= *Sesiidæ*). Places the family in the *Tineina*, before the *Gelechiadae* (p. 562). Descriptions and food-habits of *Ægeria apiformis* (p. 563) and *Trochilium* (= *Sesia*) *tipuliforme* (p. 565). [481]
1895. MURTFELDT, M. E. Borers of Cucumber-vines and Peach-trees. *Coleman's Rural World*, 1895, p. 250.
Notes on *Ægeria cucurbitæ* (= *Melittia satyriniformis*) and *Ægeria* (= *Sanninoidea*) *exitiosa*. [482]
1895. OSBORN, H., and MALLEY, C. W. Observation on Insects, Season of 1894. *Bull. No. 21, Iowa Agric. Exp. St.*, 1895, pp. 135-149.
Notes on *Melittia cucurbitæ* (= *M. satyriniformis*). [483]
1895. PAYNE, F. W. G. *The Entomologist*, Vol. XXVIII, 1895, p. 51.
Record of capture of *Trochilium* (= *Ægeria*) *apiformis* and *Sesia tipuliformis* in Derbyshire, England. [484]
1895. PERKINS, G. H. Report of the Entomologist. *8th Ann. Rep. Vermont Agric. Exp. St.*, 1895, pp. 130-132.
Account of life-history of *Sesia tipuliformis* with figures of adult, larva, and pupa. [485]
1895. PIPER, C. V. Insect Pests of the Garden, Farm, and Orchard. *Bull. No. 17, Washington Agric. Exp. St.*, 1895.
Contains note on *Sesia tipuliformis*. [486]
1895. SLINGERLAND, M. V. Habits of Squash-vine Borers. *Rural New Yorker*, 1895, p. 261.
Note on the egg-laying habits of *Melittia ceto* (= *M. satyriniformis*). [487]
1895. SOUTH, RICHARD. *The Entomologist*, Vol. XXVIII, 1895, p. 45.
Note on the habits of adult and oviposition of *Sesia tipuliformis*. [488]
1895. STINSON, J. T. Insects Injurious to Fruits and Vegetables and Remedies for destroying them. *Bull. No. 33, Arkansas Agric. Exp. St.*, 1894, p. 72.
Brief compiled account of *Sannina* (= *Sanninoidea*) *exitiosa*. [489]
1895. WEBSTER, F. M. Entomology. *Ohio Farmer*, 1895, p. 291.
Notes on the squash borer (*Melittia satyriniformis*). [490]
1895. WEBSTER, F. M. Entomology. *Ohio Farmer*, 1895, p. 157.
Notes on *Melittia ceto* (= *M. satyriniformis*). [491]
1895. WEED, C. M. Insects and Insecticides, 1895. 2d Edition, pp. 121, 122.
Nearly same account of *Sannina* (= *Sanninoidea*) *exitiosa* as in the 1891 edition. [492]
1896. BEUTENMÜLLER, W. Critical Review of the *Sesiidæ* found in America, North of Mexico. *Bull. Am. Mus. Nat. Hist.*, Vol. VIII, 1896, pp. 111-148.
Contains notes on all the species of *Sesiidæ* known up to date with the following changes: Erects the genus *Gaëa* for the preoccupied genus *Larunda* with *G. solituda* as the type and places *Ægeria emphytiiformis* in the genus *Gaëa* (p. 115); makes *Pyrrhotenia coloradensis* a synonym of *Euhagena nebraskæ* (p. 116), and *Phemonoë quinquecaudata* a synonym of *Sannina urocერიformis* (p. 117); unites *Trochilium californicum* with *Trochilium* (= *Ægeria*) *pacificum* and *Trochilium minimum* with *Ægeria tibialis* (p. 118); gives

- synonymy of *Bembecia marginata* (p. 118); unites *Trochilium* (= *Memythrus*) *luggeri* with *M. simulans* (p. 120); erects the genus *Palnia* with *Sciapteron præcedens* as the type (p. 123); places *Sciapteron admirandus* in the genus *Tirista* (p. 123); erects the genus *Sanninoidea* with *Ægeria exitiosa* as the type (p. 126); unites *Sannina pacifica* with *Ægeria* (= *Sanninoidea*) *opalescens* (p. 126); gives synonymy of *Albuna pyramidalis* (p. 127); unites *Ægeria vitrina* and *Ægeria deceptiva* with *Sesia gilvæ* (p. 128), and *Albuna resplendens*, *Albuna artemisiæ*, and *Ægeria senecioides* with *Sesia mellinipennis* (p. 129); unites *Ægeria hyperici* with *Albuna* (= *Sesia*) *rileyana* (p. 129); gives synonymy of *Sesia rutilans* (p. 130), and synonymy of *Sesia bassiformis* (p. 133); erroneously unites *Ægeria* (= *Sesia*) *bolteri* with *Sesia rubrofascia* (p. 134); original description of *Sesia culiciformis* var. *americana* (p. 136); unites *Ægeria* with *Sesia pyri* (p. 139); gives synonymy of *Sesia scitula* (p. 139); unites *Ægeria nicotianæ* with *Sesia decipiens* (p. 141), *Pyrrhotenia meadii* with *P.* (= *Sesia*) *polygona*, and *P. eremocarpi* with *P.* (= *Sesia*) *achillæ* (p. 144); unites *Carmenita minuta* with *C.* (= *Sesia*) *ruficornis* (p. 147); places *Larunda palmii* in the genus *Zenodoxus*, and unites *Zenodoxus potentillæ* with *Z.* (= *Paranthrene*) *heucheræ* (p. 148). [493]
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Reprint of 1895 accounts of *Sesia acerni* (pp. 92-93), *Sesia tipuliformis* (pp. 88-92), *Trochilium luggeri* = *Memythrus simulans* (pp. 93-94), *Trochilium* (= *Podosesia*) *fraxini* (p. 94), and *Tarsa asilipennis*. [495]
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Notes on and habits of *Melittia ceto* (= *M. satyriniformis*) with figures of moth, larvæ, cocoon, and pupa (p. 259); *Bembecia marginata* with figures of adults (p. 260); *Sannina* (= *Sanninoidea*) *exitiosa* with figures of adults (p. 261); *Sesia acerni* (p. 262) and *Sesia tipuliformis* with figures of moth, larva, and pupa (p. 263). [501]
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Brief notes on and figures of adults of *Trochilium apiforme* (p. 345) and *Sesia tipuliformis* (p. 346). [503]
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List of applications effective and non-effective against ravages of *Sannina* (= *Sanninoidea*) *exitiosa*. (Not seen.) [524]
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General compiled account of *Alcathoë caudatum* (p. 54), *Bembecia marginata* with figures of adults (pp. 54-55), *Sciapteron* (= *Memythrus*) *polistiiformis* with figures of adults, larva, and cocoon (p. 55), *Sannina* (= *Sanninoidea*) *exitiosa* with figures of adults (pp. 57-59), *Sesia tipuliiformis* with figures of moth, larva, and section of stem showing ravages (pp. 60-64), *Sesia pictipes* (p. 65). Records *Sesia hemizonæ* (= *S. rutilans*) from Minnesota (p. 64). [534]
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[539]
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PLATE XXIX.

EXPLANATION OF PLATE XXIX.

- FIG. 1.—*Melittia satyriniformis* HÜBNER, Female.
FIG. 2.—*Melittia snowii* HY. EDW., Male.
FIG. 3.—*Melittia gloriosa* HY. EDW., Female.
FIG. 4.—*Melittia grandis* (STRECKER), Female.
FIG. 5.—*Melittia magnifica* BEUTEN., Female.
FIG. 6.—*Gaëa solitudo* (HY. EDW.), Male.
FIG. 7.—*Alcathoë caudata* (HARR.), Male.
FIG. 8.—*Alcathoë caudata* (HARR.), Female.
FIG. 9.—*Sannina uroceriformis* WALK., Male.
FIG. 10.—*Egeria pacifica* (HY. EDW.), Female.
FIG. 11.—*Egeria tibialis* (HARR.), Male.
FIG. 12.—*Egeria tibialis* (HARR.), Female.
FIG. 13.—*Egeria apiformis* (LINN.), Female.
FIG. 14.—*Bembecia marginata* (HARR.), Female.
FIG. 15.—*Memythrus robinæ* (HY. EDW.), Female.
FIG. 16.—*Memythrus simulans* (GROTE), Female.
FIG. 17.—*Memythrus palmii* (HY. EDW.), Female.

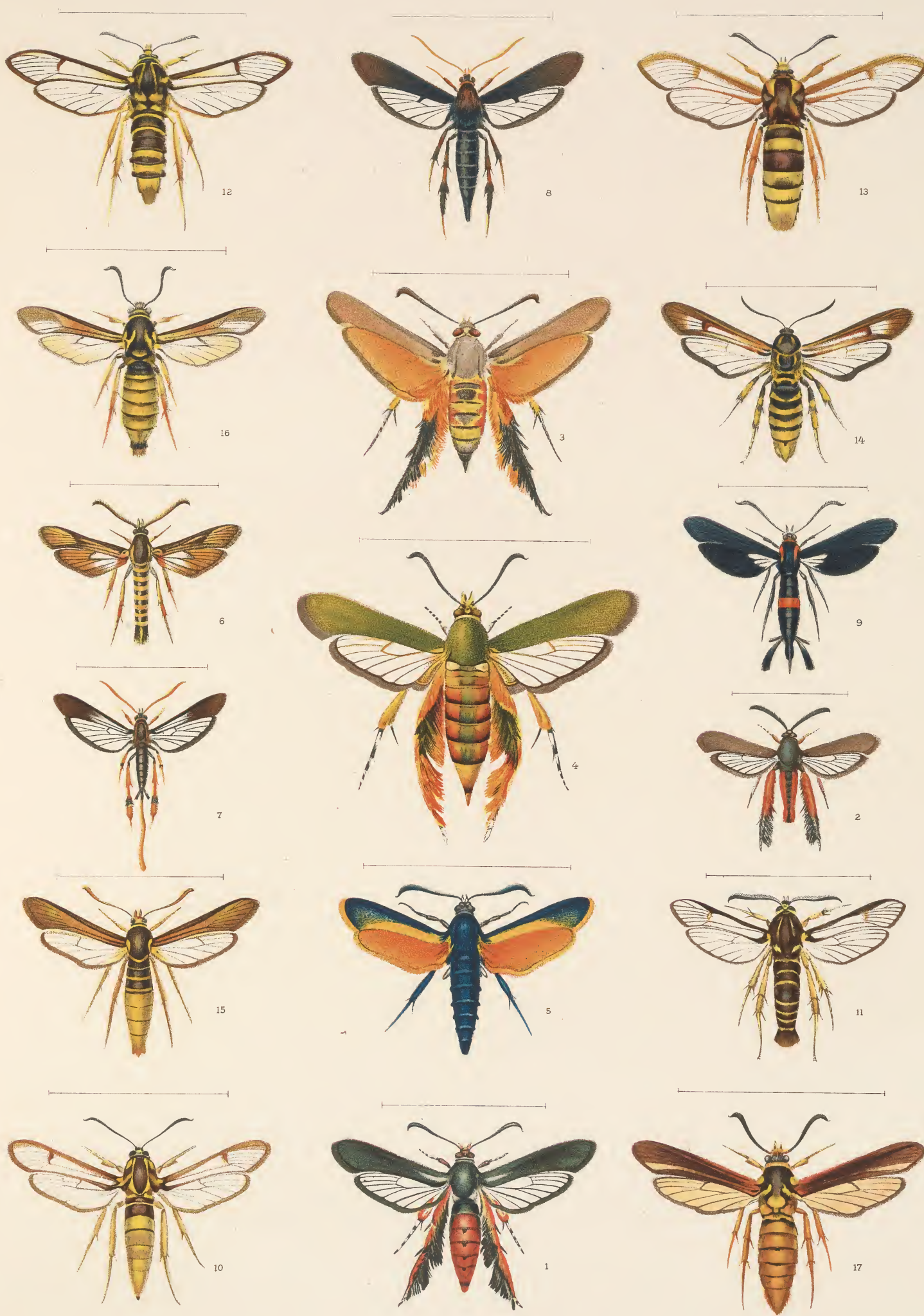
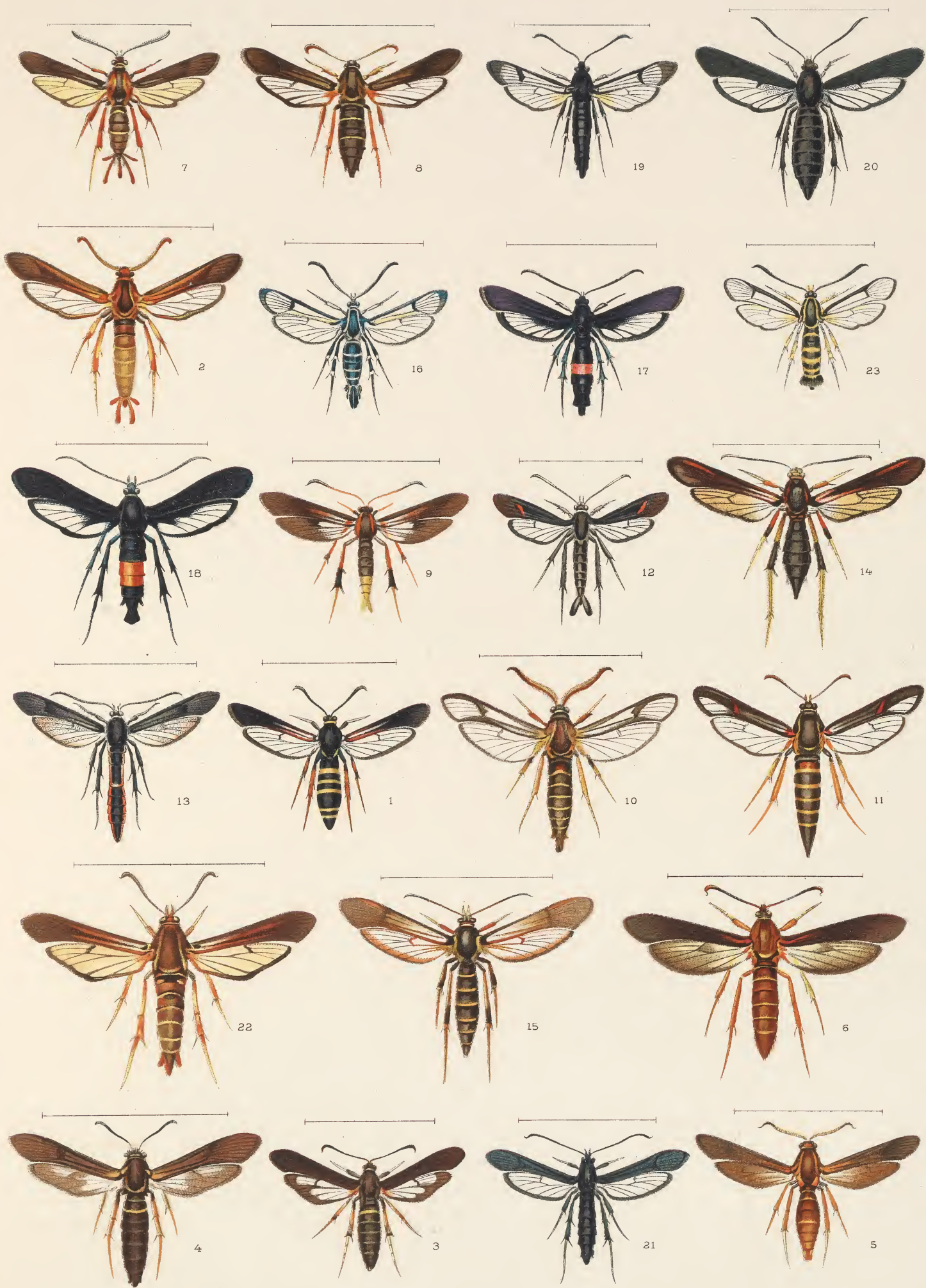


PLATE XXX.

EXPLANATION OF PLATE XXX.

- FIG. 1.—*Memythrus denotatus* (HY. EDW.), Female.
FIG. 2.—*Memythrus cupressi* (HY. EDW.), Male.
FIG. 3.—*Memythrus scepisiformis* (HY. EDW.), Female.
FIG. 4.—*Memythrus dollii* (NEUM.), Female.
FIG. 5.—*Memythrus dollii* var. *castaneus* (BEUTEN.), Male.
FIG. 6.—*Memythrus dollii* var. *castaneus* (BEUTEN.), Female.
FIG. 7.—*Memythrus polistiformis* (HARR.), Male.
FIG. 8.—*Memythrus polistiformis* (HARR.), Female.
FIG. 9.—*Palmia præcedens* (HY. EDW.), Female.
FIG. 10.—*Memythrus asilipennis* (BOISD.), Male.
FIG. 11.—*Memythrus asilipennis* (BOISD.), Female.
FIG. 12.—*Albuna fraxini* (HY. EDW.), Male.
FIG. 13.—*Parharmonia pini* (KELL.), Male.
FIG. 14.—*Podosesia syringæ* (HARR.), Female.
FIG. 15.—*Podosesia fraxini* (LUGGER), Female.
FIG. 16.—*Sanninoidea exitiosa* (SAY), Male.
FIG. 17.—*Sanninoidea exitiosa* (SAY), Female.
FIG. 18.—*Sanninoidea exitiosa* var. *edwardsii* BEUTEN., Female.
FIG. 19.—*Sanninoidea opalescens* (HY. EDW.), Male.
FIG. 20.—*Sanninoidea opalescens* (HY. EDW.), Female.
FIG. 21.—*Sanninoidea græfii* (HY. EDW.), Female.
FIG. 22.—*Memythrus seminole* (NEUM.), Female.
FIG. 23.—*Vespamima sequoiae* (HY. EDW.), Male.



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NORTH AMERICAN SESIIDÆ.

PLATE XXXI.

EXPLANATION OF PLATE XXXI.

- FIG. 1.—*Sesia saxifragæ* (HY. EDW.), Female.
 FIG. 2.—*Sesia mellinipennis* BOISD., Male.
 FIG. 3.—*Sesia bassiformis* (WALKER), Male.
 FIG. 4.—*Sesia texana* (HY. EDW.), Male.
 FIG. 5.—*Sesia decipiens* (HY. EDW.), Female.
 FIG. 6.—*Sesia prosopis* (HY. EDW.), Male.
 FIG. 7.—*Sesia tecta* (HY. EDW.), Male.
 FIG. 8.—*Sesia giliae* (HY. EDW.), Male.
 FIG. 9.—*Sesia rileyana* (HY. EDW.), Male.
 FIG. 10.—*Sesia pictipes* (G. & R.), Female.
 FIG. 11.—*Sesia rubristigma* (KELLCOTT), Male.
 FIG. 12.—*Sesia candescens* (HY. EDW.), Female.
 FIG. 13.—*Sesia decipiens* (HY. EDW.), Male.
 FIG. 14.—*Sesia novaroënsis* (HY. EDW.), Female.
 FIG. 15.—*Sesia querci* (HY. EDW.), Male.
 FIG. 16.—*Sesia pyri* (HARR.), Female.
 FIG. 17.—*Sesia corni* (HY. EDW.), Female.
 FIG. 18.—*Sesia morula* (HY. EDW.), Female.
 FIG. 19.—*Sesia tipuliformis* (CLERCK), Female.
 FIG. 20.—*Sesia sigmoidea* BEUTEN., Female.
 FIG. 21.—*Sesia corusca* (HY. EDW.), Female.
 FIG. 22.—*Sesia ithacæ* BEUTEN., Female.
 FIG. 23.—*Sesia albicornis* (HY. EDW.), Female.
 FIG. 24.—*Sesia acerni* (CLEMENS), Female.
 FIG. 25.—*Sesia scitula* (HARR.), Female.
 FIG. 26.—*Sesia mellinipennis* BOISD., Female.
 FIG. 27.—*Sesia mellinipennis* BOISD., Female.
 FIG. 28.—*Sesia fulvipes* (HARR.), Male.
 FIG. 29.—*Sesia animosa* (HY. EDW.), Male.
 FIG. 30.—*Sesia animosa* (HY. EDW.), Female.
 FIG. 31.—*Gaëa emphytiformis* (WALK.), Female.
 FIG. 32.—*Euhagena nebraskæ* HY. EDW., Male.
 FIG. 33.—*Memythrus admirandus* (HY. EDW.), Male.



PLATE XXXII.

EXPLANATION OF PLATE XXXII.

- FIG. 1.—*Sesia behrensii* (HY. EDW.), Female.
 FIG. 2.—*Sesia behrensii* (HY. EDW.), Male.
 FIG. 3.—*Sesia subærea* (HY. EDW.), Female.
 FIG. 4.—*Sesia geliformis* (WALK.), Female.
 FIG. 5.—*Sesia fragariæ* (HY. EDW.), Male.
 FIG. 6.—*Sesia fragariæ* (HY. EDW.), Female.
 FIG. 7.—*Sesia sapygæformis* (WALK.), Male.
 FIG. 8.—*Sesia polygoni* (HY. EDW.), Female.
 FIG. 9.—*Sesia polygoni* (HY. EDW.), Male.
 FIG. 10.—*Sesia achillæ* (HY. EDW.), Male.
 FIG. 11.—*Sesia floridensis* (GROTE), Male.
 FIG. 12.—*Paranthrene mexicanus* (BEUTEN.), Male.
 FIG. 13.—*Paranthrene canescens* (HY. EDW.), Male.
 FIG. 14.—*Paranthrene heucherae* (HY. EDW.), Male.
 FIG. 15.—*Paranthrene palmii* (NEUM.), Male.
 FIG. 16.—*Sesia edwardsii* (BEUTEN.), Female.
 FIG. 17.—*Sesia sanborni* (HY. EDW.), Female.
 FIG. 18.—*Sesia pyralidiformis* (WALK.), Female.
 FIG. 19.—*Sesia nigra* (BEUTEN.), Female.
 FIG. 20.—*Calasesia coccinea* (BEUTEN.), Female.
 FIG. 21.—*Sesia refulgens* (HY. EDW.), Female.
 FIG. 22.—*Sesia rutilans* (HY. EDW.), Male.
 FIG. 23.—*Sesia rutilans* (HY. EDW.), Female.
 FIG. 24.—*Sesia tepperi* (HY. EDW.), Male.
 FIG. 25.—*Sesia rileyana* (HY. EDW.), Female.
 FIG. 26.—*Sesia verecunda* (HY. EDW.), Female.
 FIG. 27.—*Sesia præstans* (HY. EDW.), Male.
 FIG. 28.—*Sesia tacoma* BEUTEN., Male.
 FIG. 29.—*Sesia tacoma* BEUTEN., Female.
 FIG. 30.—*Sesia americana* (BEUTEN.), Male.
 FIG. 31.—*Sesia arizonæ* BEUTEN., Female.
 FIG. 32.—*Sesia bolteri* (HY. EDW.), Female.
 FIG. 33.—*Sesia aureopurpurea* (HY. EDW.), Male.
 FIG. 34.—*Albuna pyramidalis* var. *montana* HY. EDW., Male.
 FIG. 35.—*Sesia ruficornis* (HY. EDW.), Female.



L. H. G. del.

NORTH AMERICAN SESIIDÆ.

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PLATE XXXIII.

EXPLANATION OF PLATE XXXIII.

- FIG. 1.—*Sesia gilicæ* (HY. EDW.), Female.
 FIG. 2.—*Sesia tecta* (HY. EDW.), Male.
 FIG. 3.—*Sesia tecta* (HY. EDW.), Female.
 FIG. 4.—*Sesia bassiformis* (WALKER), Female.
 FIG. 5.—*Sanninoidea græfi*, (HY. EDW.), Male.
 FIG. 6.—*Sesia rubrofascia* (HY. EDW.), Male.
 FIG. 7.—*Sesia aureopurpurea* (HY. EDW.), (?) Female.
 FIG. 8.—*Sesia marica* (BEUTEN.), Male.
 FIG. 9.—*Menythus tricinctus* (HARR.), Female.
 FIG. 10.—*Podosesia syringæ* (HARR.), Female, variety.
 FIG. 11.—*Alcathoë caudata* var. *walkeri* NEUM., Male.
 FIG. 12.—*Albuna pyramidalis* var. *coloradensis* HY. EDW., Female.
 FIG. 13.—*Ægeria tibialis* (HARRIS), Female, variety.
 FIG. 14.—*Sanninoidea græfi* var. *barnsii*, sp. nov., Female.
 FIG. 15.—*Sesia albicornis* (HY. EDW.), Male.
 FIG. 16.—*Sesia neglecta* (HY. EDW.), Female.
 FIG. 17.—*Sesia arctica* BEUTEN., Male.
 FIG. 18.—*Sesia seminole* BEUTEN., Male.
 FIG. 19.—*Albuna pyramidalis* var. *rubescens* (HULST), Female.
 FIG. 20.—*Sesia seminole* BEUTEN., Female.
 FIG. 21.—*Sesia mariona*, sp. nov., Female.
 FIG. 22.—*Sesia mellinipennis* BOISD., Female.



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B. Meisel, lith. Boston.

NORTH AMERICAN SESIIDÆ.

PLATE XXXIV.

EXPLANATION OF PLATE XXXIV.

- FIG. 1.—Resinous nodule on branch of big-tree (*Sequoia sempervirens*) produced by the larvæ of *Vespamima sequoiæ*.
- FIG. 2.—Inner view of resinous nodule on branch of big-tree (*Sequoia sempervirens*) showing ravages of the larvæ of *Vespamima sequoiæ*.
- FIG. 3.—Same as Fig. 2, but larger branch.
- FIG. 4.—Resinous nodule on white pine (*Pinus strobus*) produced by the larvæ of *Parharmonia pini*.
- FIG. 5.—Underside of bark showing the tortuous galleries made by the larvæ of *Parharmonia pini*.



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FOOD-HABITS OF NORTH AMERICAN SESIIDÆ.

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PLATE XXXV.

EXPLANATION OF PLATE XXXV.

- FIG. 1.—Root of blackberry showing the ravages of the larva of *Bembecia marginata*.
FIG. 2.—Trunk of alder showing injury by the larvæ of *Sesia americana*.
FIG. 3.—Trunk of pear showing the galleries in the bark, made by the larvæ of *Sesia pyri*.
FIG. 4.—Branch of willow showing the borings made by a larva of *Sesia bolteri*.
FIG. 5.—Trunk of dogwood mined by the larvæ of *Sesia scitula*.



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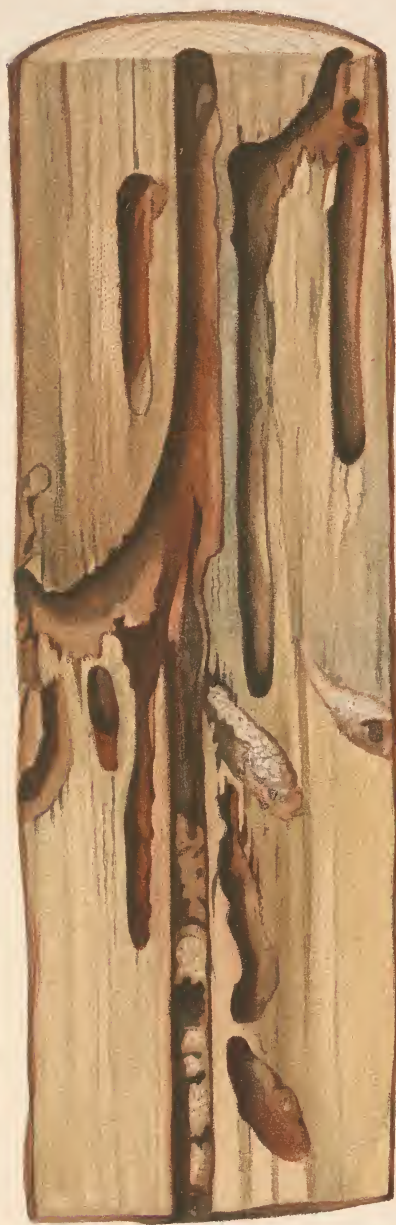


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PLATE XXXVI.

EXPLANATION OF PLATE XXXVI.

- FIG. 1.—Section of trunk of ash showing the tunnels made by the larvæ of *Podosesia syringæ*.
FIG. 2.—Trunk of maple affected by the larvæ of *Sesia acerni*.
FIG. 3.—Lower part of trunk of peach showing injury done by the larvæ of *Sanninoidea exitiosa*.
FIG. 4.—Roots of virgin's-bower (*Clematis virginiana*) affected by the larvæ of *Alcathoë caudata*.



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(Continued from 4th page of cover.)

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